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and
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in cooperation with
The North Dakota Agricultural Experiment Station
and Extension Service

CATTLE RANCHING AND RANGE UTILIZATION IN WESTERN NORTH DAKOTA

Special Report to Cooperators

By M. B. Johnson, Agent, formerly with the North Dakota Agricultural Experiment Station, and
R. D. Jennings, Agricultural Economist, Bureau of Agricultural Economics

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INTRODUCTION

The Northern Great Plains is an important part of the range livestock region. It occupies over 10 percent of the land area and has 16 percent of the cattle and 10 percent of the sheep of the entire range area. The area in western North Dakota, particularly along the Little Missouri River, is a small but important part of the Northern Great Plains.

The production of cattle in the Northern Great Plains has been the subject of cooperative study for several years. The first project was organized in 1926, the cooperating parties being the Experiment Stations of Montana, Wyoming, North Dakota, South Dakota, the Farm Management Division of the Federal Bureau of Agricultural Economics, and the Animal Husbandry Division of the Federal Bureau of Animal Industry. Detailed data relating to the organization and operation of 60 cattle ranches in the four States concerned were collected for a 3-year period, 1926-28, inclusive. The results of this study, so far as they applied to the States of North Dakota and South Dakota, were published in North Dakota Experiment Station Bulletin 237 and in South Dakota Experiment Station Bulletin 255.

To follow up this work with additional investigation and application, a supplementary project was organized involving cooperation of the two Federal Divisions already mentioned and the Experiment Station and Extension Service of the North Dakota Agricultural College. This project became effective January 1, 1931. The purposes of this supplementary project were twofold: to obtain additional information of a more detailed character, and to

attempt to get the more important findings of the original project incorporated so far as possible in the organization and practice of certain ranch operators in order to test out these findings.

The coming of the depression necessitated the changing of this project and so affected the normal operation of ranches in this territory as to defeat the objective of testing the results of the previous project, but valuable additional data were gathered during the 2 years in which the study was carried on and they are presented.

The findings of this study are applicable in a general way to ranch organization and operation throughout the Northern Great Plains under conditions in which a varying amount of crop production can be combined advantageously with the grazing of cattle. Much of the specific information is applicable only to the range area in western North Dakota.

The project as organizaed has two general phases: (1) the organization and operation of beef-cattle ranches and (2) the ownership and use of grazing and crop land in this general area. In carrying out the first and more important phase, 35 ranches located in the counties of McKenzie, Dunn, Stark, Billings, Mercer, Slope, and Golden Valley were selected for study (fig. 1). These ranches are representative of the types and sizes of cattle outfits in this area and include ranches that depend almost entirely on grazing as well as those on which cash crops are important enterprises.

In the land-ownership and use phase, three sample areas containing 864 square miles were selected for study. These sample areas are fairly representative of the grazing conditions of western North Dakota. Data relating to the ownership and status of tax payments were obtained from county records for all the ranches within the sample areas. Questionnaires, mailed to all nonresident owners, requested information as to how the land was acquired, their current returns from it, and their future plans for its use or disposal.

The "route" method was used in obtaining the data relating to the ranch business. A field man visited each ranch several times a year to collect the information; 35 ranches were included in 1931 and 30 of the same ranches in 1932. The five ranches from which information was obtained only one year are included in the tables for 1931 as they did not materially affect the averages of most items.

In early days the grazing industry preceded grain production and general farming in western North Dakota but with the opening of the country to homesteading the best land passed into the hands of farmers. In the 14 counties located west of the Missouri River there is a considerable area of rough and rolling land which is, and perhaps always will be, more suitable for the production of native grass than for any other crop. These lands are located principally along the Little Missouri River but smaller areas are scattered over the entire West River country. According to census figures there are more than 8,000,000 acres of native grass land west of the Missouri River in North Dakota. This is equal to 65 percent of the total land area of the 14 counties involved. This area, which to the casual observer looks rather worthless, if fully stocked and utilized would carry 500,000 cattle. Range-cattle production will undoubtedly become more stable in this area, and when fully adjusted to the relatively new order of controlled range it will be one of the most stable types of agricultural production in the State.

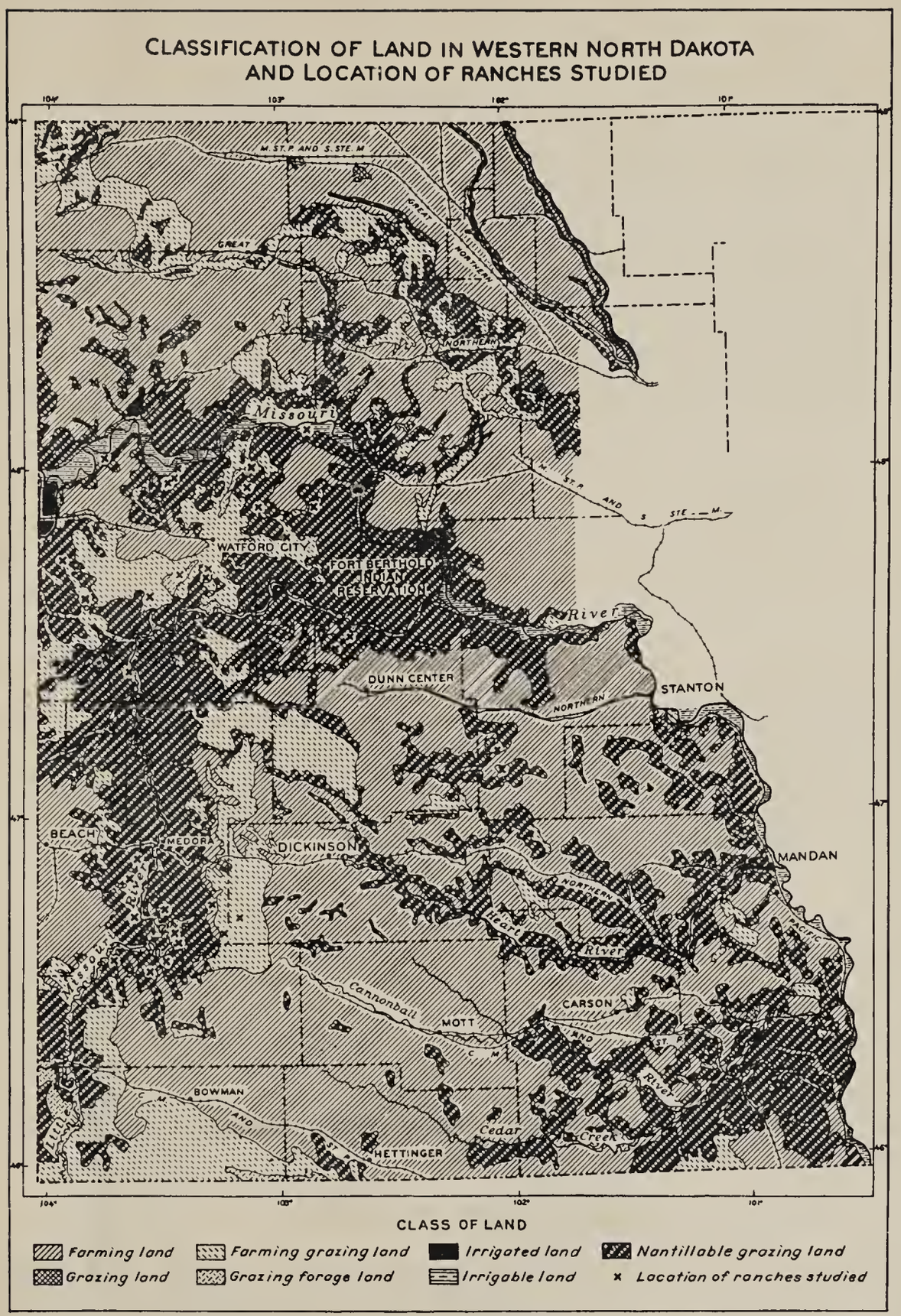

FIGURE 1.- MUCH OF THE LAND IS SUITABLE ONLY FOR GRAZING ESPECIALLY ALONG THE LITTLE MISSOURI AND OTHER RIVERS. SOME RANCHERS RUN THEIR CATTLE ON THE FORT BERTHOLD INDIAN RESERVATION.

Range-cattle production is the principal livestock enterprise in the rougher parts of the West River country, although occasional bands of sheep are found. The 3- or 4-year old, or older, grass-fat beef animal was formerly the main type of animal produced. More recently many feeder cattle from calves to 2-year olds have been sold. Since cattle are the chief product, the crops produced are principally for winter feeding and cash crops are of secondary importance. A crop such as wheat, that can be harvested for a cash crop in good years and cut for hay if it does not make a crop of grain or if the hay supply is short, is a useful crop in this area where crop production and winter feed requirements are extremely variable.

The range-livestock region, comprising a part or all of the 17 Western States, contained, in 1930, about 30 percent of the land area of the United States, 5½ percent of the crop land, 10 percent of the hay acreage, 15 percent of the alfalfa, 25 percent of the beef cattle, 37 percent of the beef cows, 44 percent of the sheep, 69 percent of the goats, and 7 percent of the horses and mules in the United States. The sub-regions into which the range-livestock region may be subdivided are shown in figure 2.

The Northern Great Plains, a part of which is in western North Dakota, is the second largest of these subdivisions in number of cattle and is first in the acreage of crop land, hay, and alfalfa. The grazing area of western North Dakota, which lies in and around the Bad Lands, is a small but important part of the Northern Great Plains.

At the time this study was made, the years 1931 and 1932 were considered to be among the most unfavorable years in the history of the range-cattle industry in this area. The season of 1931 was very dry and feed crops were a failure on many ranches. Cattle prices were the lowest in 20 years. The season of 1932 was a fair crop season but cattle prices were lower than in 1931. The 1932 prices paid for grass-fat steers at Chicago were the lowest in 22 years, whereas fixed charges like interest, taxes, and leases were nearly as high as they were 5 years earlier when cattle prices were more than twice as high as in 1932. 1/

To meet this unprecedented condition ranchmen used every means at their command to reduce operating costs and as a result the items of labor, repairs, gas and oil, purchased feed, and new machinery and equipment were reduced greatly below the point of operating efficiency on most ranches; but the fixed items, like interest, taxes, and leases remained nearly as high in 1931-32 as they were 4 years previously. This situation resulted in increased indebtedness on some ranches and in nonpayment of taxes and interest on others. Only the best-managed ranches were able to show a profit during the period under discussion.

CLASSIFICATION OF RANCHES

Ranches in this area may be grouped into three classes which for convenience of reference will be called Classes A, B, and C. These designations do not carry any significance as to relative quality or desirability. Class A ranches include all those ranches that are located on the uplands, away from river flats and largely outside of the Bad Lands. A few that may be included in this group are located on the edge of the Bad Lands with grazing in the Bad Lands and crop land on the adjoining plateau. This group is

1/ Chicago Daily Drovers Journal Yearbook, 1932.

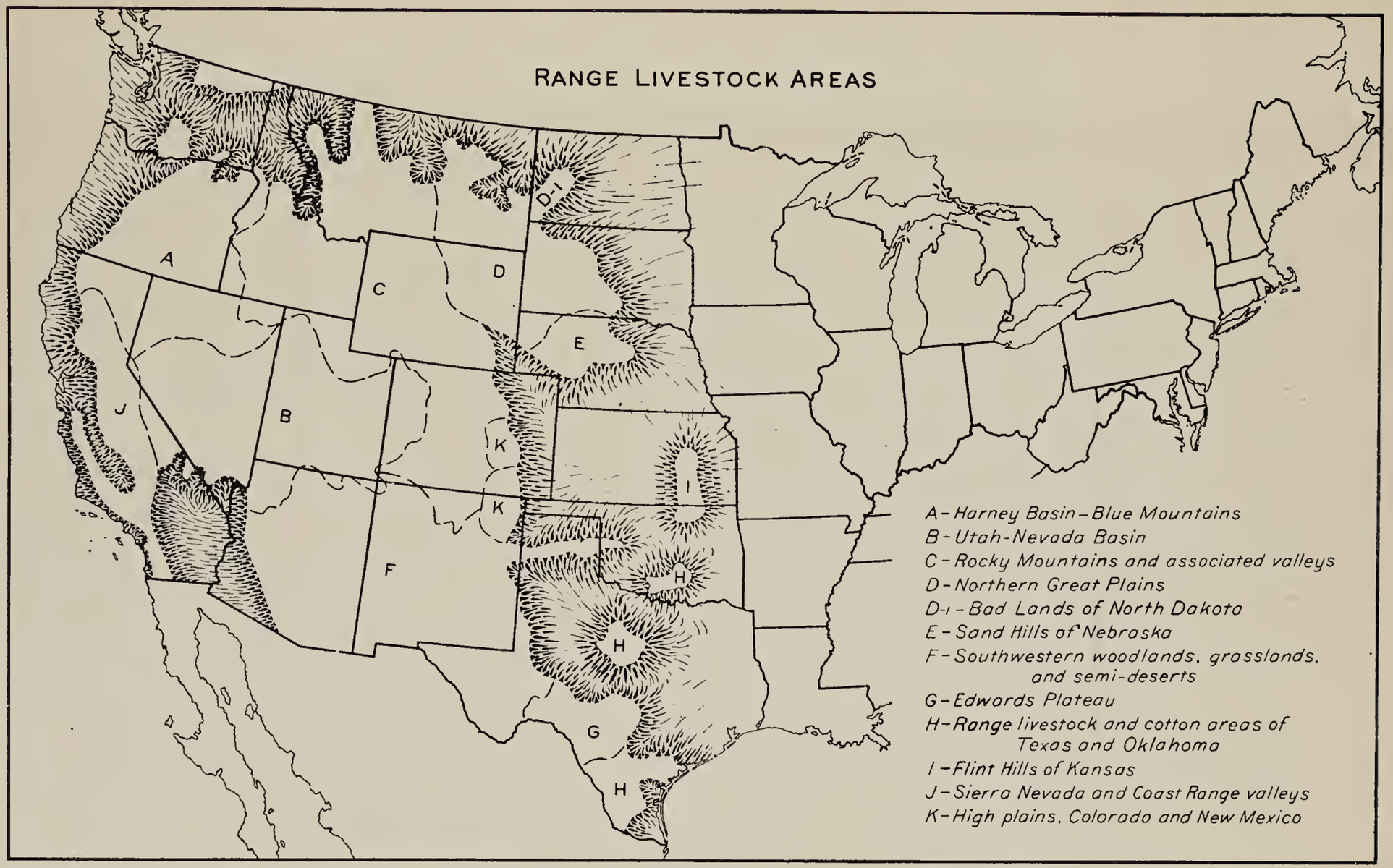

FIGURE 2.- THE RANGE AREA OF NORTH DAKOTA LIES ON THE BORDER OF THE WESTERN RANGE LIVESTOCK REGION AND THE GREAT PLAINS WHEAT REGION TO THE EAST.

characterized by a relatively large amount of crop land in proportion to the grazing land available. They have little wild-hay land and therefore raise most of their feed as well as grain crops on their best upland soil. A few, located on creek flats, have crop land of relatively high quality. The grazing lands of this group consist largely of rolling uplands which are of higher carrying capacity than those of the Bad Lands because there are no bare areas and which are higher priced than grazing lands in the Bad Lands. Much of this grazing land is owned by people who think it may be used for farming sometime and consequently value it for sale at more than the ranchmen can afford to pay for grazing land. The ranchman's control of his range is largely through leases. Relatively little free grazing is used by this group of ranchmen. Records on the ranch business on 17 ranches of Class A were obtained in 1931 and on 15 ranches in 1932.

These ranches have little or notnatural shelter because the land is nearly level and has few canyons or timbered draws (fig. 1). Consequently the ranchmen in this group must build sheds to protect the cattle in winter. This additional investment is compensated for, at least partially, in the larger calf crops obtained in the more open country. Wild hay is not a dependable winter feed on these ranches. The wild hay available is grown principally on uplands which produce fair yields during wet years but fail in dry seasons, This necessitates the production of cultivated crops for winter feed. The proportion of land suitable for raising hay or other crops to the extent of grazing land used is high, being about 1 to 10. All ages of cattle, from calves to 3- and 4-year-old steers, are marketed but there is a tendency for younger ages to be marketed from these ranches than from those with less feed in proportion to grazing.

Class B ranches are located on river flats or other bottom land where wild hay is the principal source of feed. Since these ranches produce an abundance of wild hay, relatively little additional cultivated feed is grown. For their grazing land this group of ranches depends largely upon leases on the Fort Berthold Indian Reservation. Without the reservation leases they would have to cut down the number of cattle handled. The proportion of hay and other crop land to grazing land used, which includes the leased land, is about 1 to 15. 2/ These ranchmen generally sell 3- to 4-year-old steers. These ranches produce a larger number of cattle per ranch than are grown on the other classes but there are fewer ranches of this class in the region. Records of the ranch business were obtained on five ranches of Class B for both 1931 and 1932.

Class C, the third group of ranches, consists of ranches located in the Bad Lands proper. The proportion of land in hay and other crop land on which feed can be grown, to the grazing land is about 1 to 13 on these ranches. This is a smaller proportion of hay and other crop land to grazing land than on the Class A ranches but larger than on the Class B ranches, if the acreage on Indian land is included. The grazing land is very rough and broken, although plentiful, and the control is probably the most inadequate of any of the classes of ranches because of the scattered ownerships of land throughout the entire area. All ages of cattle are sold from these ranches. The average number of cattle handled is about the same as on Class A ranches. This is the second most important class of ranches in the area as far as

2/ The ratio of hay and other crop land to grazing land given for the various classes of ranches is for all land used including the leased land.

numbers are concerned. For convenience this group of ranches is designated in this report as Class C ranches. Records of the ranch business were obtained on 12 ranches of this kind in 1931 and on nine ranches in 1932.

A record was also obtained on one ranch that did not belong to any of the three groups described because it had important features common to two or more of them. It is omitted from the data shown in the tables for the three classes but is included in the data for all ranches studied.

VARIATION IN ORGANIZATION OF RANCHES

Land Used and Crops Raised

The average acreage of land used in 1931 on all the ranches studied was 8,633 acres or 13½ sections (table 1). There was a wide range in size, with four ranches having less than 3,000 acres and three having 20,000 acres or more (table 2). One section, or 640 acres, was the average acreage of crop land, and the grazing land averaged about 12½ sections or 7,993 acres. There were three ranches with 15,000 acres or more and five with less than 2,000 acres of owned or leased grazing land. It was estimated that about 1,038 acres, or 13 percent of the grazing land used, was free range although 12 ranches used no free range. Of the 640 acres of hay and other crop land, 353 acres were classed as land used for growing grain or cultivated crops, 203 acres as native-hay land, and 84 acres as tame-hay land. All but one of the ranches had some farm land and one ranch had over 1,000 acres. Eleven ranches had no tame-hay land and nine had no native-hay land. Only four ranches had as much as 600 acre of native-hay land. The smallest ranch comprised 1,520 acres of land and the largest 34,580 acres or about 54 sections. The largest acreage of free range used was 3,840 acres. The largest acreage of native-hay land was 870 acres and of land used for growing grain or cultivated crops 1,030 acres.

Table 1. - Average acreage of different kinds of land per ranch, by class of ranch, western North Dakota, 1931 and 1932

Class of ranch 1/	Year	Ranches	Hay and other crop land per ranch - Tame hay	Native hay	Other crop land 2/	Total	Land pastured per ranch - Controlled 3/	Estimated free range	Total	Total land used per ranch
		Number	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres
A	1931	17	68	124	455	647	5,489	518	6,007	6,654
	1932	15	76	96	472	644	5,792	563	6,355	6,999
B	1931	5	74	558	302	934	13,493	900	14,393	15,327
	1932	5	29	618	347	994	13,337	900	14,237	15,231
C	1931	12	92	181	241	514	5,223	1,918	7,141	7,655
	1932	9	64	233	299	596	5,634	1,889	7,523	8,119
All ranches 4/	1931	35	84	203	353	640	6,955	1,038	7,993	8,633
	1932	30	71	224	393	688	7,439	998	8,437	9,125

1/ See pages 4 to 7 for description of classes of ranches.
2/ Other crop land is used to mean land used for small grain, corn, and other cultivated crops.
3/ Acreage that could be fenced. The "free" range is so intermingled with the tracts that could be fenced that all must be used as "open" range.
4/ Includes one ranch not included in any one class because it contains features common to all classes.

Table 2. - Number of ranches that had specified acreages of hay, other crop land, and pasture land per ranch, western North Dakota, 1931

Acres per ranch	Ranches having specified acreage in -					
	Native hay land	Tame hay land	Other crop land	Grazing land 1/	Estimated free range	Total land used
	Number	Number	Number	Number	Number	Number
None	9	11	1		12	
Under 25	1	2				
25 to 49	2	3	2			
50 to 99	6	5	2			
100 to 199	3	10	4			
200 to 399	8	4	13		3	
400 to 599	2		10			
600 to 999	4		2		4	
1,000 to 1,999			1	5	6	1
2,000 to 2,999				5	8	3
3,000 to 4,999				7	2	7
5,000 to 7,499				5		9
7,500 to 9,999				7		5
10,000 to 14,999				3		5
15,000 to 19,999				2		2
20,000 and over				1		3

1/ Grazing land owned or leased.

All of the 35 ranches studied in 1931 leased some land (table 3). Five ranches leased all the land they used except free range; two of these had 15,000 acres or more. One ranch owned 8,800 acres and leased 640 acres. One ranch owned 6,080 acres and leased 14,460 acres.

Table 3. - Number of ranches that had specified acreages of owned and leased land per ranch, western North Dakota, 1931

Acres of leased land per ranch	Ranches owning							
	No land	Under 1,000 acres	1,000 to 1,999 acres	2,000 to 2,999 acres	3,000 to 4,999 acres	5,000 to 7,499 acres	7,500 acres and over	Total
	Number	Number	Number	Number	Number	Number	Number	Number
Under 1,000		2		5	1		1	9
1,000 to 1,999		1	1	2	1	1		6
2,000 to 2,999	1	2			3			6
3,000 to 4,999					1	2		3
5,000 to 7,499	1		1	2	1			5
7,500 to 9,999								0
10,000 to 14,999	1		1			1		3
15,000 and over	2			1				3
Total	5	5	3	10	7	4	1	35

Feed production was the principal problem on these ranches. The kinds and quantities of feed raised in 1931 and 1932 on the ranches of different classes are shown in tables 4 to 7. In the dry year 1931, not all of the ranches having native (wild) hay meadows cut hay on them and the average acreage cut was only 136 acres, whereas the average acreage of the hay meadows was 274 acres (table 4). Only 36 percent of the hay land was cut in 1931, whereas 80 percent was cut in 1932. The most important single roughage raised on these ranches in 1932 was native hay (table 5). In 1931 grain hay was the most important feed and it was second in importance in 1932. On only three ranches in 1931 and five ranches in 1932 was alfalfa the most important feed. About one-half the ranches raised corn fodder but it was the most important feed on only one ranch in 1931 and on none in 1932. A similar situation existed in regard to millet. Sweetclover was raised on one-half the ranches in 1932 and one-sixth of the ranches in 1931. It was the most important roughage on two ranches in 1931 and on three ranches in 1932.

Table 4. - Number of ranches that had native-hay meadows, number on which native hay was cut, and average acreage of each per ranch, by class of ranch, western North Dakota, 1931 and 1932

Class of ranch	Year	Ranches	Ranches having native-hay land		Ranches on which some native hay was cut		Percentage of total hay land cut
			Ranches	Native hay	Ranches	Native hay cut	
		Number	Number	Acres	Number	Acres	Percent
A	1931	17	12	175	6	92	26.4
	1932	15	11	131	11	112	85.1
B	1931	5	5	558	4	269	38.5
	1932	5	5	618	5	1/ 660	106.8
C	1931	12	8	272	8	96	35.2
	1932	9	7	300	3/ 8	93	35.5
All ranches 2/	1931	35	26	274	19	136	36.2
	1932	30	24	280	3/ 25	214	79.7

1/ Includes some acreage cut not included in native-hay land per ranch.
2/ Includes one ranch not included in any class.
3/ On one ranch some hay was cut on upland pasture not listed as native-hay land.

In 1931 an average of 205 tons of roughage was raised to winter an average of 451 head of cattle or 0.46 ton per head (table 6). Over half the roughage was grain hay (table 7). Native hay amounted to only 18 percent of the total. In 1932, 497 tons of roughage were produced per ranch or 0.99 ton per head of cattle to be wintered. This is more than twice the production of 1931. About 35 percent of this was native hay, 18 percent each for grain hay and straw and 14 percent tame hay. Only 5,148 pounds of grain were produced on the average ranch in 1931 whereas 130,792 pounds were produced in 1932. Wheat, oats, and barley were the principal grain crops. In 1931, 27 of the 35 ranches seeded wheat (table 8).

Table 5. - Distribution of ranches by specified kinds of feed raised and by the most important feed, by class of ranch, western North Dakota, 1931 and 1932

RANCHES WHICH RAISED SPECIFIED CROPS

Class of ranch	Ranches		Alfalfa		Sweet-clover		Native hay		Grain hay		Millet		Corn fodder		Other roughage	
	1931	1932	1931	1932	1931	1932	1931	1932	1931	1932	1931	1932	1931	1932	1931	1932
	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number
A	17	15	4	7	3	6	6	11	14	13	10	7	8	7	-	2
B	5	5	1	1	-	2	4	5	3	4	1	1	-	1	-	-
C	12	9	4	2	3	5	8	8	8	7	6	1	5	5	-	5
All ranches 1/	35	30	9	11	6	14	19	25	26	25	18	10	13	13	-	7

RANCHES ON WHICH THE SPECIFIED CROP WAS THE MOST IMPORTANT FEED 2/

A	17	15	1	4	1	1	1	6	10	4	1	-	1	-	-	-
B	5	5	-	-	-	-	3	5	2	-	-	-	-	-	-	-
C	12	9	2	1	1	2	3	2	6	2	-	-	-	-	-	2
All ranches 1/	35	30	3	5	2	3	7	13	19	7	1	-	1	-	-	2

1/ Includes one ranch not included in any class.
2/ Most important measured by the quantity.

Table 6. - Quantity of feed raised per head of cattle to be wintered the following winter, by class of ranch, western North Dakota, 1931 and 1932

Kind of feed raised	Class A ranches		Class B ranches		Class C ranches		All ranches	
	1931	1932	1931	1932	1931	1932	1931	1932
	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons
Hay and fodder	0.44	0.69	0.22	0.98	0.64	0.73	0.41	0.79
Straw and thistles	.04	.32	-	.05	.05	.19	.03	.18
Silage	.05	.06	-	-	-	-	.02	.02
All roughage	.53	1.07	.22	1.03	.69	.92	.46	.99
	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
Grain 1/	29	407	-	113	3	241	11	261

1/ Grain raised includes all wheat and other grain that may be fed or sold.

Table 7. - Kind and average quantity of feed and cash crops produced per ranch in 1931 and 1932, by class of ranch, western North Dakota

Item	Unit	Class A ranches		Class B ranches		Class C ranches		All ranches 1/	
		1931	1932	1931	1932	1931	1932	1931	1932
Ranches	Number	17	15	5	5	12	9	35	30
Cattle to be wintered the following winter	do	342	376	888	980	358	407	451	501
Roughage									
Tame hay	Tons	20	70	2	69	21	55	17	70
Native hay	do	12	58	121	766	33	52	37	175
Grain hay	do	92	89	61	118	143	80	105	92
Millet	do	12	13	12	7	13	7	12	12
Fodder	do	14	26	-	1	20	50	14	28
Straw	do	5	121	-	47	-	75	3	91
Silage	do	17	24	-	-	-	-	8	12
Thistles	do	7	-	-	-	16	-	9	-
Other hay	do	-	1	-	-	-	54	-	17
Total roughage	do	179	402	196	1,008	246	373	205	497
Crops grazed									
Corn	Acres	15	14	-	-	1	2	8	8
Small grain	do	1	3	92	-	-	-	13	2
Grain harvested									
Oats	Bus.	21	653	-	1,324	-	772	10	895
Barley	do	56	609	-	200	-	832	27	614
Corn	do	35	-	-	-	8	-	20	-
Speltz	do	3	340	-	200	-	-	2	203
Wheat	do	70	1,377	-	744	10	513	37	992
Flax	do	3	12	-	26	-	25	2	18
Rye	do	-	105	-	80	-	21	-	72
Total grain harvested	Pounds	9,808	152,900	-	110,544	1,048	97,996	5,148	130,792
Other crops									
Alfalfa seed	do	-	453	400	-	-	-	57	227
Potatoes	Bus.	-	23	-	-	-	-	-	12

1/ Includes one ranch not included in any class.

Table 8. - Number of ranches seeding specified crops and utilizing the crops in specified ways, western North Dakota, 1931 and 1932 1/

Crop and year	Ranches on which the specified crop was -				
	Seeded	Harvested for grain	Harvested for hay	Grazed	Failure
	Number	Number	Number	Number	Number
Wheat					
1931	27	6	22	2	3
1932	25	23	15	-	-
Oats					
1931	28	4	20	1	5
1932	26	18	17	-	-
Barley					
1931	20	2	11	3	5
1932	19	17	5	-	-
Spetlz					
1931	7	1	3	1	2
1932	6	6	-	-	-
Flax					
1931	7	1	2	1	3
1932	5	4	-	-	2
Rye					
1931	9	-	7	1	1
1932	9	5	5	1	-

1/ Thirty-five ranches in 1931 and 30 ranches in 1932 were included in this study. In addition to the crops here specified, two ranches grew alfalfa seed in 1931 and in 1932, and two grew potatoes in 1932.

The differences among the three classes of ranches are readily apparent from a study of these tables. Much more land suitable for growing grain or cultivated crops in proportion to grazing land was available on the Class A ranches than on either of the other groups. The ratio was about 1 to 13. Grain hay, tame hay, straw, and corn fodder had a more important place on these ranches than on the other two types. The quantity of roughage raised per head of cattle to be wintered was 0.53 ton in 1931 and 1.07 tons in 1932. This was more feed than was raised on the Class B ranches but less than on the Class C ranches in 1931.

The Class B ranches are those that depend upon the Indian reservation for most of their grazing and have good native-hay meadows. These ranches average twice as large as the others. The ratio of land suitable for growing grain or cultivated crops to grazing land is 1 to 41 or 47 (table 1). They have the largest average acreage of native hay, each ranch having from 300 to 840 acres

averaging over 500 acres. In the dry year 1931, two of the five ranches in this group cut more grain hay than native hay. In 1932 native hay was the most important feed. The feed raised on Class B ranches in 1931 per head of cattle to be wintered was the lowest of any group (table 6) but a greater reserve was carried over from the preceding year. The quantity of roughage per head of cattle to be wintered, carried over as a reserve, amounted to 0.50, 0.62, and 0.53 ton respectively on Class A, B, and C ranches in 1931. In 1932 the corresponding figures were 0.32, 0.09, and 0.19 ton. The average quantity per head carried over on all ranches was 0.54 ton in 1931 and 0.21 ton in 1932. Class B ranches usually sold their cattle as 3- and 4-year-old steers which ordinarily do not require much winter feeding. This makes the roughage needed per head of all cattle lower than on the other groups of ranches.

The Class C ranches or those located in the Bad Lands proper were slightly larger than Class A ranches, averaging 7,655 acres in 1931. The ratio of land suitable for growing grain or cultivated crops to grazing land was about 1 to 25 or 30. More free range was used in this group of ranches because of the large extent of land in this area owned by people living outside of the area. More grain hay was produced than any other kind of feed. Native hay was next in importance, although considerable straw and fodder were raised in 1932.

Use of Land on Class A Ranches

The average amount of land used on Class A ranches was 6,654 acres per ranch in 1931 (table 1). On an average, 2,812 acres were owned, and 3,324 acres were leased with 518 acres of free range. Of this total acreage, 68 acres were in tame hay, 124 acres in native hay, 455 acres were in other crop land, and 6,007 acres in grazing land. The total land used was equal to 21.9 acres per head of cattle on land January 1.

Class A ranches have to depend upon growing on cultivated land a large part of their roughage because their native-hay bottom land is relatively scarce and native hay is unreliable on high lands. Alfalfa and sweetclover give low yields during dry seasons. Grain hay is the most dependable kind of feed for this class of ranches especially during dry seasons. These ranches usually have more crop land than they need for feed production and consequently grow wheat and other crops for sale. In dry years when feed production is short some or all of the grain ordinarily sold may be cut for feed. Straw, a by-product of cash grain crops, is also available for feed.

Twelve ranches in the group of 17 have native-hay land (table 4). During 1931, only six of these cut any native hay. They averaged 92 acres cut per ranch with production 0.37 ton per acre (table 9). The dry season of 1931 accounts for the small number of ranches that cut native hay that year. The yield of native hay, except on bottom land, was so low that cutting it was unprofitable. In 1932, which was near the average in rainfall, 11 ranches cut native hay. The acreage cut that year was 112 acres per ranch and the production 0.71 ton per acre. The total production of native hay on the entire group of Class A ranches was 205 tons in 1931 and 874 tons in 1932. This is a fair illustration of the unreliable nature of native hay as a feed crop on the high lands. On only one ranch was native hay the most important feed in 1931 whereas in 1932 it was the most important on six ranches.

Table 9. - Total acreage and yield per acre of roughages, by class of ranch, western North Dakota, 1931 and 1932 1/

TOTAL PLANTED ACREAGE 2/

Crop	Class A		Class B		Class C		All ranches	
	1931	1932	1931	1932	1931	1932	1931	1932
	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres
Hay								
Alfalfa	340	1,010	11	125	231	135	582	1,420
Sweetclover	99	135	-	125	90	272	189	632
Native	555	1,230	1,075	3,300	765	745	2,575	5,355
Grain	2,549	1,300	540	460	1,860	690	5,139	2,510
Millet	367	226	84	30	112	80	571	371
Other	-	27	-	-	-	410	-	437
Fodder	316	303	-	4	270	260	586	567
Silage	102	170	-	-	-	-	102	170

YIELD PER ACRE PLANTED

	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons
Hay								
Alfalfa	0.85	0.89	1.09	1.00	0.90	1.26	0.87	0.92
Sweetclover	.50	1.12	-	1.76	.49	1.18	.50	1.25
Native	.37	.71	.56	1.16	.51	.63	.51	.98
Grain	.61	1.03	.56	1.28	.92	1.05	.72	1.10
Millet	.57	.87	.71	1.17	1.39	.75	.75	.93
Other	-	.63	-	-	-	1.18	-	1.15
Fodder	.75	1.28	-	1.00	.89	1.74	.81	1.49
Silage	2.74	2.06	-	-	-	-	2.75	2.06

1/ See table 5 for numbers of ranches which raised each of the crops for roughage.
2/ The total planted acreage was harvested for all crops except on Class A ranches where 29 acres of sweetclover and 307 acres of millet were harvested in 1931, and 189 acres of millet were harvested in 1932; also, on Class C ranches where 102 acres of millet were harvested in 1931.

The four Class A ranches that produced alfalfa in 1931 cut a total of 340 acres (table 9). The production was 288 tons, an average of 0.85 ton per acre. Alfalfa was the most important hay crop on only one ranch in 1931 (table 5). Some ranches seeded alfalfa in 1931. During 1932, alfalfa was cut on 7 ranches. The total acreage was 1,010 and the production was 900 tons or 0.89 ton per acre. Alfalfa was the most important hay crop on four ranches in that year.

Sweetclover was grown on three Class A ranches during 1931 but only two ranches cut any sweetclover for hay. The total production from the 99 acres in sweetclover was 50 tons or 0.5 ton per acre. The yield on the 29 acres cut was 1.72 tons per acre. During 1932, six ranches cut sweetclover hay. The total acreage in sweetclover was 135 and the production was 151 tons or 1.12 tons per acre. These figures indicate the very low yields that may be expected from these

three classes of hay on high uplands during dry seasons. Sweetclover gave the lowest yield, except for native hay, during the dry season of 1931, but outyielded all other kinds of hay during the more normal season of 1932. Sweetclover was the most important hay crop on only one ranch each year. Yields of alfalfa were higher than sweetclover yields during the dry year. Neither of these classes of hay is dependable when grown on high uplands; on such locations grain hay has outyielded them.

Out of 17 Class A ranches that seeded grain (mostly wheat and oats) during 1931, there were only three total failures (table 10.) Fourteen ranches harvested 2,549 acres of grain hay. The production was 1,562 tons or 0.61 ton per acre. During 1932, 1,300 acres produced 1,337 tons, an average of slightly more than one ton per acre. Grain hay was the most important hay crop on 10 ranches in 1931 and on four ranches in 1932. The importance of grain hay during dry years is indicated by the number of ranches on which this class of hay was most important in 1931. A few ranches that have only a small amount of land suitable for growing grain or cultivated crops make a practice of raising grain hay every year whereas a majority of ranches in this group harvest and thresh their grain crops during normal seasons when other classes of hay are available but cut their grain for hay during dry years when other classes of hay are short or have failed. This accounts for the reduction of the grain-hay acreage in 1932 and the relatively greater importance of wild hay that year.

Table 10. - Number of ranches on which operators seeded grain, harvested grain, and cut grain hay, by class of ranch, western North Dakota, 1931 and 1932

Class of ranch	Ranches		Ranches on which operators - Seeded grain		Harvested some grain		Cut some grain for hay		Harvested no grain or hay		Grazed part of acreage	
	1931	1932	1931	1932	1931	1932	1931	1932	1931	1932	1931	1932
	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number
A	17	15	17	15	7	15	14	13	3	0	1	1
B	5	5	5	5	-	4	3	4	2	0	2	-
C	12	9	9	8	1	5	8	7	1	1	-	-
All ranches 1/	35	30	32	29	8	25	26	25	6	1	3	1

1/ Includes one ranch not included in any class.

Millet is gaining favor in some districts as an emergency or late-seeded hay crop. Ten ranches in the group raised millet hay during 1931. A total of 367 acres was raised and the production was 211 tons or 0.57 ton per acre. During 1932, seven ranches raised millet; the acreage that year was 226 and the production was 196 tons or 0.87 ton per acre. Millet was the most important feed on one ranch during 1931 but on none in 1932.

Corn fodder was raised on eight ranches during 1931. The total acreage was 316 and the production 236 tons or 0.75 ton per acre. Seven ranches raised corn fodder in 1932. The acreage was 303 and the production was 389 tons or 1.28 tons per acre. In addition to the above, 260 acres of corn were grazed in 1931 and 205 acres in 1932. To graze standing corn is an established practice on a few ranches. Two ranches in the group raised 102 acres of corn for silage in 1931. The production was 280 tons or 2.74 tons per acre. The same two ranches raised 170 acres for silage in 1932 and the production that year was 350 tons or 2.06 tons per acre. One ranch used silage to feed a dairy herd and the other for wintering beef cattle, mostly calves.

The production of straw was negligible in 1931, being approximately 100 tons on the entire group, whereas in 1932 the total production was 1,815 tons. When fed in conjunction with concentrates straw has proved a fairly satisfactory feed for wintering mature cattle.

All ranches in group A seeded grain crops in 1931. Sixteen percent of the acreage seeded was cut for grain, 53 percent was cut for hay, less than one percent was grazed, and 30 percent was a failure (table 11). The total acreage of wheat seeded was 2,099 (table 12). Of this amount 969 acres were cut for hay and 420 acres for grain, from which 1,190 bushels of wheat were threshed or approximately 3 bushels per acre. A total of 1,245 acres of oats was seeded and 90 acres were threshed, producing 360 bushels or 4 bushels per acre. Out of a total of 459 acres of barley 155 acres were threshed and the production was 950 bushels or 6 bushels per acre. Speltz seeded was 268 acres of which 10 acres were threshed, yielding 55 bushels or 5.5 bushels per acre.

Table 11. - Percentage of acreage seeded to grain that was harvested in different ways, by class of ranch, western North Dakota, 1931 and 1932

Class of ranch	Ranches seeding grain		Acreage seeded that was -							
			Cut for grain		Cut for hay		Grazed		Failure	
	1931	1932	1931	1932	1931	1932	1931	1932	1931	1932
	Number	Number	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
A	17	15	16.2	66.3	52.9	30.0	0.4	1.1	30.5	2.6
B	5	5	-	61.6	40.2	38.4	34.2	-	25.6	-
C	9	8	2.0	59.8	93.5	40.2	-	-	4.5	-
All ranches 1/	32	29	9.8	64.3	61.6	33.5	5.8	.7	22.8	1.5

1/ Includes one ranch not included in any class.

Table 12. - Total acreage and yield per acre of grain and seed on different classes of ranches in western North Dakota, 1931 and 1932

Crop	Acreage planted								Acreage harvested for grain or seed	
	Class A ranches		Class B ranches		Class C ranches		All ranches		All ranches	
	1931	1932	1931	1932	1931	1932	1931	1932	1931	1932
	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres
Wheat	2,099	2,121	379	470	483	613	2,951	3,299	460	2,412
Oats	1,245	1,018	366	550	858	615	2,619	2,283	90	1,049
Barley	459	530	404	65	509	348	1,412	972	155	827
Flax	135	172	95	27	-	60	230	259	50	147
Corn	661	205	-	-	282	18	943	251	57	-
Speltz	268	188	50	60	-	-	318	248	10	248
Rye	525	307	50	25	140	86	715	418	-	124
Alfalfa seed	-	70	75	-	-	-	75	70	75	70
	YIELD PER ACRE (seeded for grain)								Yield per acre harvested for grain	
	Bus.	Bus.	Bus.	Bus.	Bus.	Bus.	Bus.	Bus.	Bus.	Bus.
Wheat	1.1	12.4	-	10.5	2.9	12.7	1.0	12.3	2.8	12.3
Oats	.8	21.1	-	32.3	-	24.8	.6	25.6	4.0	25.6
Barley	3.4	22.0	-	15.4	-	24.0	2.3	22.3	6.1	22.3
Flax	.5	1.1	-	4.8	-	3.8	.4	2.1	1.1	3.6
Corn	8.0	-	-	-	50.0	-	9.1	-	12.3	-
Speltz	.4	27.1	-	16.7	-	-	.4	24.6	5.5	24.6
Rye	-	17.9	-	16.0	-	17.0	-	17.4	-	17.4
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Alfalfa seed	-	97.1	26.7	-	-	-	26.7	97.1	26.7	97.1

During 1932, all crop yields were higher than in 1931; 1,659 acres of wheat produced 20,652 bushels or 12.4 bushels per acre; 464 acres of oats produced 9,794 bushels or 21.1 bushels per acre; 415 acres of barley produced 9,131 bushels or 22.0 bushels per acre; and 188 acres of speltz produced 5,102 bushels or 27.1 bushels per acre. A small quantity of corn was husked one year and a total of 236 bushels of flax was produced during the 2-year period.

During 1932, two ranches cut 70 acres of alfalfa for seed and threshed 6,800 pounds of seed valued at 15 cents per pound, with a total value of $1,020.

Use of Land on Class B Ranches

In 1931, the average amount of land used by Class B ranches was 15,327 acres (table 1). This is the largest acreage used in any group of ranches. Of the total acreage per ranch 963 acres were owned, 13,464 were leased, and 900 acres of free range were used. Of the total acreage 74 acres were in tame hay, 558 acres in wild hay, 302 acres in other crop land, and 14,393 acres in grazing land.

This group of ranches depends for its roughage largely upon native-hay bottom land, hence feed production is usually rather dependable. All ranches in the group have native-hay land. The acreage varied from 300 to 840 acres per ranch. During 1931, four ranches cut native hay. The fifth ranch in this group cut no native hay in 1931 because a considerable tonnage of hay had been carried over from the preceding year and, with it, the grain hay produced provided more than enough hay to carry the cattle through the winter. The yield of native hay was slightly less than 0.60 ton per acre on the acreage cut and the average production on the four ranches cutting native hay in 1931 was 151 tons per ranch. All ranches in this group had carried over a considerable tonnage of hay from the preceding year. Native hay was the most important hay on three ranches of this group in 1931 (table 5). In 1932 all Class B ranches cut native hay. The total acreage of native hay was cut that year and approximately 100 acres of native hay per ranch were cut from land listed as grazing land. The average acreage cut that year was 660 acres per ranch and the production was 766 tons or 1.16 tons per acre. Native hay was the most important feed on all ranches in this group that year.

Alfalfa was raised on one of the ranches; 125 acres were devoted to this crop. During 1931 only 11 acres were cut and the yield was approximately one ton per acre. In 1932 the entire acreage was cut, yielding a total of 125 tons. Feed production on the Class B ranches is usually not much of a problem. They have good native-hay meadows that produce a surplus of feed in good years and yield more feed per acre in poor years than is usually raised on upland crop land. The quality of the hay is not so high as on the upland ranches since much of it is coarse. Some choice alfalfa and wheat grass are produced.

No sweetclover was grown on these ranches in 1931 and it was grown on only two ranches in 1932. In 1931 the crop was a total failure, but 125 acres yielded 220 tons or 1.76 tons per acre in 1932.

All ranches in group B seeded grain in 1931, but no grain was threshed. Three ranches cut the grain for hay, one ranch grazed the entire grain acreage, and on one ranch it was a failure. The total acreage cut on three ranches was 540 acres and the production was 305 tons or 0.56 ton per acre. Grain hay was the most important feed on two ranches that year. During 1932 all ranches again grew grain. That year 38 percent of the grain acreage was cut for hay and 62 percent for grain. The acreage cut for hay was 460 acres and the total production was 590 tons or 1.28 tons per acre. Grain hay was not of major importance on any ranch that year.

Millet was grown on one ranch each year. In 1931, 84 acres produced 60 tons or 0.71 ton per acre; in 1932, 30 acres produced 35 tons or 1.17 tons per acre. Corn fodder was not grown on any ranch in this group during 1931; only 4 acres were grown on one ranch in 1932—the production was 4 tons.

No straw was produced in 1931 and only 235 tons were grown on the entire group in 1932. No grain was raised during 1931. In 1932, 355 acres of wheat produced 3,720 bushels or 10.5 bushels per acre; 205 acres of oats produced 6,620 bushels or 32.3 bushels per acre; 65 acres of barley produced 1,000 bushels or 15.4 bushels per acre; 60 acres of speltz produced 1,000 bushels or 16.7 bushels per acre; 25 acres of rye and 27 acres of flax produced 400 bushels and 130 bushels respectively. The production of grain on this group of ranches was not sufficient to meet requirements and some concentrates were bought by most ranches every year.

Use of Land on Class C Ranches

In 1931, the total land used per ranch in Class C was 7,655 acres. Of this amount 2,493 acres were owned, 3,244 acres were leased, and in addition 1,918 acres of free range were used per ranch. This is more than twice the amount of free range used by any other group.

On the Class C ranches (those located in the Bad Lands) the production of feed is of great importance as the ranches are short of good hay meadows or of land suitable for growing grain or cultivated crops in proportion to the grazing land available. Of the total acreage, 92 acres are in tame hay, 181 acres in native hay, 241 acres in other crop land, and 7,141 acres in grazing land per ranch. Eight ranches in the group have native-hay land. These ranches have an average of 272 acres per ranch. During 1931 all cut some native hay. The acreage cut was 96 acres per ranch or 35 percent of the total acreage. The production was 49 tons per ranch or 0.51 ton per acre. Only the best of the native hay was cut because of the dry season. During 1932, with the same number of ranches cutting native hay as in 1931, the acreage cut was 93 acres per ranch and the production was 58.5 tons per ranch or 0.63 per acre. Native hay was the most important feed (measured by quantity) on three ranches in 1931 and on two ranches in 1932.

During 1931, four ranches raised alfalfa hay. The total acreage was 231 acres and the production 207 tons or 0.90 ton per acre. Records of production for 1932 are available for two ranches - 135 acres were raised and the production was 170 tons or 1.3 tons per acre. The alfalfa raised on these ranches was all grown on bottom land. Alfalfa hay was the most important hay crop on two ranches in 1931 and on one ranch in 1932.

Sweetclover was raised on three ranches in 1931, involving 90 acres; the production was 44 tons or 0.49 ton per acre. During 1932, five ranches raised 272 acres of sweetclover hay and the production that year was 321 tons or 1.18 tons per acre. On two ranches sweetclover was the most important hay crop produced that year.

Grain hay was raised on 8 out of 12 ranches during 1931. The total acreage was 1,860 acres and the production was 1,713 tons or 0.92 ton per acre. In 1932, seven ranches raised grain hay; 690 acres produced 725 tons, slightly more than one ton per acre. Grain hay was the most important feed crop raised on six ranches in 1931 and on two in 1932. In common with ranches in other districts these operators cut nearly all their grain for hay during the dry season of 1931 whereas in 1932 only 40 percent of the grain was cut for hay and 60 percent was threshed.

Millet is relatively unimportant on Class C ranches, 216 tons being produced by the entire group during the 2-year period. Fields that had been allowed to become infested with wild oats on four ranches were allowed to grow up to volunteer wild oats during 1932, and 370 acres produced 445 tons of hay or 1.2 tons per acre. Corn fodder was raised on five ranches in 1931. The total acreage was 270 acres and the production 239 tons or 0.89 ton per acre. During 1932, five ranches raised corn fodder. The acreage that year was 260 acres and the production 452 tons or 1.74 tons per acre. No straw was produced in 1931 but a total of 675 tons was produced in 1932.

No grain was produced on Class C ranches in 1931 except 40 acres of wheat which yielded 116 bushels. During 1932, four ranches raised 363 acres of wheat and the production was 4,619 bushels or 12.7 bushels per acre; 280 acres of oats produced 6,950 bushels or 24.8 bushels per acre; 312 acres of barley produced 7,490 bushels or 24.0 bushels per acre; 11 acres of rye produced 127 bushels; and 60 acres of flax 225 bushels. Grain-crop production was not sufficient to meet the feed requirements on this group of ranches.

Livestock

The number of cattle increased considerably during the 2 years of this study. The average number of cattle on all ranches increased from 386 on January 1, 1931 to 501 on January 1, 1933 (table 13). There was an increase of 16.8 percent in 1931 and 11.1 percent in 1932. These ranches were following the general trend of the industry as cattle numbers in the United States during 1931 and 1932 were in the upward swing of the cycle which began in 1928. Cows and heifers increased more than other classes of cattle. Of the 30 ranches for which figures are available for both years, 25 increased their cattle during 1931 and 28 increased their cattle during 1932 (table 14).

The number of cattle on Class A ranches increased about 24 percent in the 2-year period. The increase was mostly in cows and heifers. A greater increase in both the breeding herd and in steers was made on the other groups of ranches than on Class A ranches, notably because Class A ranches were more nearly stocked to capacity than were the other groups and grazing land for lease was not readily available.

On the average ranch, cows 3 years old and over made up about 40 percent of all cattle, 2-year-old heifers 10 percent, yearling heifers 14 percent, bulls one percent, yearling steers 14 percent, 2-year-old steers 10 percent, 3-year-old steers and older 8 percent, and spayed heifers 3 percent (table 15). Cows and heifers showed some increase and steers 3 years old and over and spayed heifers showed some decrease during the 2-year period. Steers 2 years old and over and spayed heifers made up a larger percentage of the total on Class B ranches than on the ranches of the other two classes. This is to be expected since Class B ranches lease grazing land on the Indian reservation and use it mainly for older cattle. Class C ranches in the Bad Lands had a smaller percentage of aged steers and a high percentage of cows than did the other classes.

Table 13. - Average number per ranch of each class of cattle on hand January 1, by class of ranch in western North Dakota, 1931-33

Class of ranch	Year	Ranches	Cows	Heifers: Year-lings 1/	Heifers: Two years old	Heifers: Spayed	Herd bulls	Steers: Year-lings 1/	Steers: Two years old	Steers: Three and four years old	Other cattle	Total
		Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number
A	1931	17	120	42	30	4	4	45	35	24	-	304
	1932	15	143	54	31	4	4	52	28	26	-	342
	1933	15	154	58	39	2	4	59	33	27	-	376
B	1931	5	245	111	74	75	10	111	83	81	2	792
	1932	5	303	111	85	77	12	112	109	78	1	888
	1933	5	364	104	108	45	11	104	113	121	10	980
C	1931	12	133	40	29	2	4	43	22	28	1	302
	1932	9	169	54	35	1	4	54	22	18	1	358
	1933	9	181	56	52	-	4	61	38	15	-	407
All ranches 2/	1931	35	146	53	38	13	5	55	39	36	1	386
	1932	30	182	65	42	15	5	64	42	35	1	451
	1933	30	201	67	56	9	5	68	50	43	2	501

1/ These are the calves born during the previous year or short yearlings on January 1.
2/ Includes one ranch not included in any class.

Table 14. - Number of ranches on which the numbers of cattle per ranch were increased or decreased during 1931 and 1932, by class of ranch, western North Dakota

Class of ranch	Ranches	Ranches on which cattle were increased or decreased from Jan. 1, 1931 to Jan. 1, 1932: Cows: Increased	Cows: Decreased	All cattle: Increased	All cattle: Decreased	Jan. 1, 1932 to Jan. 1, 1933: Cows: Increased	Cows: Decreased	All cattle: Increased	All cattle: Decreased
	Number	Number	Number	Number	Number	Number	Number	Number	Number
A	15	13	2	12	3	11	4	14	1
B	5	5	0	5	0	5	0	5	0
C	9	8	1	8	1	6	3	8	1
All ranches 1/	30	27	3	25	5	23	7	28	2

1/ Includes one ranch not included in any class.

The average number of cattle on all ranches was 386 on January 1, 1931 and 451 on January 1, 1932 (table 13). The number varied from 71 to 1,469 in 1931. There were two ranches with less than 100 head and three with more than 750. The remaining ranches were rather evenly divided as to number of cattle (table 16). Class A ranches were generally smaller as to numbers of cows than the others (table 17). The two largest ranches among those studied were in Class B. These had about 500 cows each for the period.

In the 2 years combined, 10 of the 30 ranches sold calves or yearlings principally, 6 sold 2-year-old steers and 14 sold 3-year-old steers (table 18). All of the Class B ranches sold 3-year-old steers principally. Class A and Class C ranches sold cattle of all ages.

The average number of cattle sold per ranch was 96 head in 1931 and 79 head in 1932 (table 19). On the Class A ranches yearlings made up from 35 to 40 percent of all cattle sold, 2-year-olds from 15 to 20 percent, 3-year-olds and over about 22 percent, and cows from 13 to 21 percent (table 20). On the Class B ranches about 50 to 60 percent of the cattle sold were 3- and 4-year-old steers and 40 percent cows and spayed heifers. On Class C ranches about 19 percent were calves, 27 percent yearlings, 16 percent 2-year-olds, 18 percent 3- or 4-year-olds and 20 percent cows. Nearly half the cattle sold on the Class C ranches were calves and yearlings. About half the cattle sold on the Class A ranches were yearlings and 2-year-olds and half the cattle sold on the Class B ranches were 3-year-olds and over.

The variation in the number sold on individual ranches was great, varying from 8 head to 420 in 1931 and from 0 to 263 in 1932. In 1931, about 40 percent of the ranches sold from 50 to 99 head of cattle (table 21). The number sold was about one-fourth the number on hand; that is, a ranch having 500 head of cattle sold about 125. The number sold annually was about half the number of cows on hand. Eighteen of the 30 ranches sold less cattle in 1932 than in 1931 and 12 sold more.

The average number of horses and mules kept per ranch was 40, of which, on an average, 7 were saddle horses, 13 were work horses or mules, and the remainder were other horses or mules (table 22). The average number of cattle on these ranches was 386 or about 55 cattle for each saddle horse and 30 for each work horse. Most of the ranches had a few hogs for home use.

Investment and Indebtedness

The average total investment of all ranches in 1931 was $45,214 (table 23). Investment as used in this report means the value of the items included, at current prices on January 1 on the year in question. It is not the amount originally invested by the ranchman. The investments centered around $30,000 to $40,000, although there was a wide variation. The extreme variation was from $11,478 to $132,330. Land and improvements

Table 15. - Percentage distribution of cattle on different classes of ranches in western North Dakota, January 1, 1931, 1932, and 1933

Class of ranch	Year	Cows	Heifers: Yearlings 1/	Heifers: Two years old	Heifers: Spayed	Steers: Herd bulls	Steers: Yearlings 1/	Steers: Two years old	Steers: Three and four years old	Other cattle	Total
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
A	1931	39.5	13.8	9.9	1.3	1.3	14.8	11.5	7.9	-	100.0
	1932	41.8	15.8	9.0	1.2	1.2	15.2	8.2	7.6	-	100.0
	1933	40.9	15.4	10.4	.5	1.1	15.7	8.8	7.2	-	100.0
B	1931	30.9	14.0	9.3	9.5	1.3	14.0	10.5	10.2	0.3	100.0
	1932	34.1	12.5	9.6	8.7	1.3	12.6	12.3	8.8	.1	100.0
	1933	37.2	10.6	11.0	4.6	1.1	10.6	11.5	12.4	1.0	100.0
C	1931	44.0	13.3	9.6	.7	1.3	14.2	7.3	9.3	.3	100.0
	1932	47.2	15.1	9.8	.3	1.1	15.1	6.1	5.0	.3	100.0
	1933	44.5	13.7	12.8	-	1.0	15.0	9.3	3.7	-	100.0
All ranches 2/	1931	37.8	13.7	9.9	3.4	1.3	14.2	10.1	9.3	.3	100.0
	1932	40.4	14.4	9.3	3.3	1.1	14.2	9.3	7.8	.2	100.0
	1933	40.1	13.3	11.2	1.8	1.0	13.6	10.0	8.6	.4	100.0

1/ These are the calves born during the previous year or short yearlings on January 1.
2/ Includes one ranch not included in any class.

Table 16. - Distribution of ranches by specified numbers of cattle on hand January 1 and cattle sold during the year, western North Dakota, 1931 and 1932

Number of head	Ranches reporting designated numbers of: Cows on hand January 1 - 1931	Cows on hand January 1 - 1932	All cattle on hand January 1 - 1931	All cattle on hand January 1 - 1932	Cattle sold during the year - 1931	Cattle sold during the year - 1932
	Number	Number	Number	Number	Number	Number
Under 25		1			4	6
25 to 49	3				6	8
50 to 74	4	3	1		13	5
75 to 99	8	8	1	3	2	3
100 to 149	9	6	7	1	3	3
150 to 199	3	2	4	4	3	1
200 to 299	3	5	5	7	2	4
300 to 399	3	3	5	3	1	
400 to 499	2	2	2	2	1	
500 to 749			7	6		
750 to 999			1	1		
1,000 to 1,249				1		
1,250 and over			2	2		
Total	35	30	35	30	35	30

Table 17. - Number of ranches of each class having specified numbers of cows on hand, January 1, western North Dakota, 1931

Number of cows on hand January 1, 1931	Class A ranches	Class B ranches	Class C ranches	Total
	Number	Number	Number	Number
Under 50	3	-	-	3
50 to 99	7	-	5	12
100 to 199	4	3	5	12
200 to 299	1	-	1	1/ 3
300 to 399	2	-	1	3
400 and over	-	2	-	2
Total	17	5	12	1/ 35

1/ Includes one ranch not included in any class.

Table 18. - Number of ranches on which operators sold principally cattle of specified age classes, by class of ranch, western North Dakota, 1931 and 1932 combined

Class of ranch	Ranches	Ranches on which operators sold - Calves	Yearlings	2-year old steers and heifers	3- and 4-year old steers and spayed heifers
	Number	Number	Number	Number	Number
A	15	3	3	4	5
B	5	-	-	-	5
C	9	1	3	2	3
All ranches 1/	30	4	6	6	14

1/ Includes one ranch not included in any class.

Table 19. - Average number of each class of cattle sold per ranch by class of ranch in western North Dakota, 1931 and 1932

Class of ranch	Year	Ranches	Calves	Yearlings		Two years old		Three and four years old		Cows and other cattle	Total
				Steers	Heifers	Steers	Heifers	Steers	Spayed heifers		
		Number	Number	Number	Number	Number	Number	Number	Number	Number	Number
A	1931	17	8	20	14	14	4	20	-	12	92
	1932	15	1	16	12	10	1	16	1	14	71
B	1931	5	1	-	4	8	1	58	32	14	118
	1932	5	-	-	-	-	-	66	31	18	115
C	1931	12	18	19	5	12	1	16	2	12	85
	1932	9	11	15	2	11	-	11	-	16	66
All ranches 1/	1931	35	10	16	10	12	4	26	5	13	96
	1932	30	4	13	6	8	1	25	6	16	79

1/ Includes one ranch not included in any class.

Table 20. - Percentage distribution of cattle sold on different classes of ranches in western North Dakota, 1931 and 1932

Class of ranch	Year	Calves	Yearlings		Two years old		Three and four years old		Cows and other cattle	Total
			Steers	Heifers	Steers	Heifers	Steers	Spayed heifers		
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
A	1931	8.7	21.7	15.2	15.2	4.4	21.7	-	13.1	100.0
	1932	1.4	22.6	16.9	14.1	1.4	22.5	1.4	19.7	100.0
B	1931	.8	-	3.4	6.8	.8	49.2	27.1	11.9	100.0
	1932	-	-	-	-	-	57.4	27.0	15.6	100.0
C	1931	21.2	22.3	5.9	14.1	1.2	18.8	2.4	14.1	100.0
	1932	16.7	22.7	3.0	16.7	-	16.7	-	24.2	100.0
All ranches 1/	1931	10.4	16.7	10.4	12.5	4.2	27.1	5.2	13.5	100.0
	1932	5.1	16.5	7.6	10.1	1.3	31.6	7.6	20.2	100.0

1/ Includes one ranch not included in any class.

Table 21. - Distribution of ranches by number of cattle sold during the year, and by number of cows on hand January 1, western North Dakota, 1931

Number of cows on hand January 1, 1931	Ranches on which operators sold during the year -							Total
	Under 25 cattle	25 to 49 cattle	50 to 99 cattle	100 to 149 cattle	150 to 199 cattle	200 to 399 cattle	400 cattle and over	
	Number	Number	Number	Number	Number	Number	Number	Number
Under 50	1	1	1	-	-	-	-	3
50 to 99	3	3	6	-	-	-	-	12
100 to 199	-	2	7	2	-	1	-	12
200 to 299	-	-	1	1	1	-	-	3
300 to 399	-	-	-	-	1	1	1	3
400 and over	-	-	-	-	1	1	-	2
Total	4	6	15	3	3	3	1	35

Table 22. - Number of ranches for which the average numbers of specified kinds of livestock per ranch were reported, by class of ranch, western North Dakota, 1931 1/

Class of ranch		Work horses and mules		Saddle horses		Other horses		Total horses and mules		Hogs	
	Ranches	Ranches reporting	Average reported per ranch	Ranches reporting	Average reported per ranch	Ranches reporting	Average reported per ranch	Ranches reporting	Average reported per ranch	Ranches reporting	Average reported per ranch
	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number
A	17	17	12	17	6	14	21	17	35	12	15
B	5	5	18	5	11	4	54	5	73	5	9
C	12	12	10	12	6	10	8	12	25	9	7
All ranches 2/	35	35	13	35	7	29	25	35	40	27	12

1/ Only one ranch reported any sheep.
2/ Includes one ranch not included in any class.

Table 23. - Distribution of average investment and indebtedness per ranch, on different classes of ranches, western North Dakota, January 1, 1931, 1932, and 1933

Item	Class A ranches			Class B ranches			Class C ranches			All ranches 1/		
	1931	1932	1933	1931	1932	1933	1931	1932	1933	1931	1932	1933
Ranches Number	17	15	15	5	5	5	12	9	9	35	30	30
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Investment												
Land 2/	19,415	16,977	17,004	4,322	4,323	4,549	8,402	8,564	8,564	13,797	12,791	12,843
Buildings and improvements	5,813	5,390	5,254	5,426	5,273	5,134	4,763	4,294	4,145	5,553	5,214	5,056
Machinery and equipment	2,953	2,756	2,202	2,886	2,429	2,051	1,898	1,575	1,178	2,569	2,343	1,863
Cattle	14,470	13,935	12,736	39,072	38,518	37,249	13,788	13,802	13,193	18,449	18,648	17,622
Horses and other livestock	1,563	1,630	1,711	2,041	1,891	1,867	869	823	809	1,458	1,503	1,530
Feed and cash crops	3,469	2,672	3,138	6,077	4,646	6,495	2,116	2,358	2,498	3,389	2,943	3,545
Total	47,683	43,360	42,045	59,824	57,080	57,345	31,836	31,416	30,387	45,214	43,442	42,459
Indebtedness												
Land	2,090	2,098	2,004	240	2,640	3,240	1,083	844	844	1,706	2,100	2,154
Cattle	1,276	1,821	2,734	18,020	17,117	19,756	4,442	4,244	4,474	4,946	5,304	6,335
Total	3,366	3,919	4,738	18,260	19,757	22,996	5,525	5,088	5,318	6,652	7,404	8,489
Net worth	44,317	39,441	37,307	41,564	37,323	34,349	26,311	26,328	25,069	38,562	36,038	33,970

1/ Includes one ranch not included in any class.
2/ Does not include value of leased land.

made up 43 percent of the total investment and cattle 41 percent (table 24). The value of leased land is not included in investment. Five ranches had no investment in land. There was a wide variation in the investment in cattle, varying from $3,310 to $80,830. The value of feed and crops on hand January 1 varied considerably; most of the ranches had between $1,000 and $4,000 in this item (table 25). The value of machinery and equipment was less variable; it averaged $2,569 per ranch. Three ranches had less than $1,000 and five ranches had more than $4,000 in this item. The average value of horses and other livestock on hand in 1931 was only $1,458.

Only eight ranches had no indebtedness in 1931 (table 25). Thirteen ranches out of 30, excluding those entirely leased, had no mortgage on their land. Twelve of the 35 ranches had no indebtedness secured by cattle or other assets. The average total indebtedness was $6,652 (table 23). Each of eight ranches had an indebtedness of $10,000 or more. The average indebtedness secured by a mortgage on land, including those ranches with none, was $1,706. The average other indebtedness was $4,946; most of this was secured by chattel mortgage on cattle.

The average investment in cattle on the Class B ranches was nearly 3 times as large as was true in either of the other classes. The investment in land does not show a corresponding difference because two of the largest ranches in this group were entirely leased with no capital investment in land. The largest individual investment in land was in the Class A group. The largest individual investment in cattle was in Class B ranches; the largest average indebtedness was in this group also. All the ranches in this group were in debt, four of them owing an amount equal to about one-half the value of their cattle.

Investment on Class A Ranches

There are 17 ranches in Class A. Investment has been divided into 6 parts: Land, improvements, cattle, feed and cash crops inventoried, machinery and equipment, and horses and other livestock (table 23). In 1931, the total ranch investment in Class A ranches ranged from $11,478 to $132,330 with an average of $47,683 per ranch. The largest item of investment on Class A ranches is in land and improvements. This investment ranges from nothing (where all the land and improvements are leased) to $83,030, with an average of $25,228 per ranch. This is 53 percent of the total investment. The owned land ranges from nothing to 8,800 acres with an average of 2,812 acres per ranch. Total land used was 6,654 acres per ranch. No other group of ranches has such a high investment in land. This can be explained by the fact that land is relatively high priced in the districts where these ranches are located and by the fact that a larger percentage of the land used is owned by the operators than is the case with any other group. Grazing land is not so readily available for leasing as in the other district. While Class A has the highest percentage of investment in land of any group the total acreage used, which includes owned and leased land and free range, is the smallest of any group, with an average of 6,654 acres per ranch.

The investment in cattle on Class A ranches is 30 percent of the total investment. This is the lowest percent investment in cattle of any group and is due to the relatively high investment in land. This investment ranged from $3,310 to $45,185 with an average of $14,470 per ranch. The numbers of

Table 24. - Distribution of total investment by class of ranch, western North Dakota, January 1, 1931

Class of ranch	Ranches	Percentage of investment in -						
		Land and improvements 1/	Cattle	Feed	Cash crops	Machinery and equipment	Horses and other livestock	Total
	Number	Percent	Percent	Percent	Percent	Percent	Percent	Percent
A	17	53	30	6	2	6	3	100
B	5	16	65	9	1	5	4	100
C	12	41	43	6	1	6	3	100
All ranches 2/	35	43	41	6	1	6	3	100

1/ Does not include value of leased land.
2/ Includes one ranch not included in any class.

Table 25. - Distribution of ranches by specified amounts of investment or indebtedness in various items per ranch, western North Dakota, January 1, 1931

Amount	Ranches with investment in -						Ranches with indebtedness -		
							Secured on -		
	Land and improvements	Cattle	Feed	Machinery and equipment	Horses and other livestock	Total	Land	Cattle and other assets	Total
Dollars	Number	Number	Number	Number	Number	Number	Number	Number	Number
None	5						18	12	8
Under 1,000			3	3	16			3	2
1,000 to 1,999			12	10	11		5	3	2
2,000 to 2,999			6	10	5		6	3	3
3,000 to 3,999		1	5	7	2		2	3	1
4,000 to 4,999	2	3	3	4				1	2
5,000 to 7,499	1	8	2	1	1		2	2	6
7,500 to 9,999	2	2	1					3	3
10,000 to 14,999	6	6	3			3	2	3	4
15,000 to 19,999	6	4				2			2
20,000 to 24,999	6	4				5			
25,000 to 29,999	3	1				2		1	1
30,000 to 39,999		3				9			
40,000 to 49,999	2	1				4		1	1
50,000 to 74,999		1				4			
75,000 to 99,999	2	1				4			
100,000 and over						2			

cattle on hand January 1, 1931 were 304 per ranch. The investment in feed was 6 percent of the total investment or $2,686 per ranch. This is equal to $8.84 worth of feed for each head of cattle wintered - the highest per-head investment in feed of any group. The investment in cash crops on hand was 2 percent of the total investment with an actual value of $783 per ranch. These crops consisted of wheat, flax, and rye. The investment in machinery was 6 percent of the total investment with a value of $2,953 per ranch. The investment in horses, sheep, and hogs amounted to 3 percent or $1,563 per ranch. All ranches in the group had horses but only one ranch had sheep and 12 of the 17 ranches had hogs.

Investment on Class B Ranches

Class B is the smallest group, with five ranches. The ranches in this group differ from those in the other groups mainly in having a dependable hay supply in low-land hay meadows. These ranches are the largest in acres of land used and numbers of cattle handled per ranch. In 1931, total investment ranged from $38,292 to $96,528 with an average of $59,824 per ranch. This is the largest average investment of any group, Land and improvements ranged from 0 to $19,250 with an average investment of $9,748 per ranch. This is equal to 16 percent of the total investment and the smallest percent investment in land of any group. This relatively small investment in land can be explained by the fact that the two largest ranches in the group leased all the land used. The owned land ranged from 0 to 2,415 acres with an average of 963 acres per ranch whereas the total land used was 15,327 acres per ranch. This is equal to 19.4 acres of land for each head of cattle on hand January 1, 1931.

The investment in cattle was 65 percent of the total investment. This high investment in cattle is accounted for by the relatively low investment in land. The range was from $14,870 to $80,830 with an average of $39,072 per ranch. The number of cattle on hand January 1, 1931 was 792 per ranch. The investment in feed was 9 percent of the total investment or $5,648 per ranch. This is equal to $7.13 worth of feed per head of cattle wintered. The investment in cash crops (wheat, flax, and rye) was relatively unimportant on this group of ranches. This investment was only one percent of the total with a value of $429 per ranch on January 1, 1931. The investment in machinery was 5 percent with a value of $2,886 per ranch. This includes farm machinery, trucks, and automobiles. The investment in horses and other livestock except cattle was 4 percent with a value of $2,041 per ranch. There were no sheep on this group of ranches but all ranches kept hogs.

Investment on Class C Ranches

The 12 ranches in Class C are located in the Bad Lands proper along the Little Missouri River or its tributaries. The total investment ranged from $12,839 to $57,306 per ranch with an average of $31,836 in 1931. This is the lowest total investment of any group and although the numbers of cattle are about the same per ranch as those on Class A ranches, the total investment is $15,847 less per ranch, largely because of the lower land values in the Bad Lands and the greater use of free range. The investment in land and improvements ranged from 0 to $24,020 with an average of $13,165 per ranch. This

is 41 percent of the total investment. The owned land ranged from 0 to 6,720 acres with an average of 2,493 acres per ranch; the total land used, which includes owned and leased land and free range, was 7,655 acres per ranch. This is equal to 25.3 acres per head of cattle on hand January 1, 1931.

The investment in cattle on Class C ranches ranged from $5,346 to $25,040 per ranch, with an average investment of $13,788. This is 43 percent of the total investment. The number of cattle on hand January 1, 1931 was 302 head per ranch. The investment in feed was $1,939 per ranch, This is 6 percent of the total investment and is equal to $6.42 worth of feed per head of cattle wintered. This is the lowest per-head investment in feed of any group. The investment in cash crops is negligible and amounts to less than one percent with a value of $177 per ranch on January 1, 1931. Machinery and equipment was 6 percent of the total investment with a value of $1,898 per ranch. Horses and other livestock, except cattle, constituted 3 percent with a total value of $869 per ranch. No ranch in this group had sheep, but 9 out of 12 kept some hogs.

Ranch Income and Expense

On the average ranch, cash receipts exceeded cash expenditures by $58 in 1931 and lacked $482 of equaling expenditures in 1932 (table 26). This does not include household, family, or personal expenses. In 1931 there were 16 out of 35 ranches on which the cash receipts did not equal cash expenditures (table 27). In 1932 there were 14 out of 30 ranches in this situation. The Class B ranches showed the largest percentage of ranches on which receipts did not meet expenses and they also showed the largest average losses.

Ranch income was computed for the ranches in this study for 1931 and 1932. Sales of cattle, other livestock, or livestock products, grain and other crops, and any increase in cattle or feeds on hand at the end of the year were included in receipts. Sale of land or machinery was not included. Expenses include cattle or other livestock bought and the ordinary cash operating expenses of the ranch such as feed, labor, leases, taxes, and repairs. Expenses also include any decrease in cattle or feeds on hand at the end of the year, depreciation on buildings and machinery, and value of unpaid family labor.

Cattle were inventoried at the same price at the end of the year as at the beginning. The increase in inventory of cattle therefore represents the increase in value due to increase in number of cattle if the price had remained constant. The decrease in inventory of cattle in the expenses represents a decrease in the value of cattle on those ranches on which numbers of cattle decreased during the year. Cattle prices decreased both years. For this reason a figure has been included which represents the decrease in the value of cattle on hand at the end of the year due to the decline in the price of cattle. This is called "decrease in market value of cattle inventoried". The drop in cattle prices is also reflected in the sales of cattle. The total effect of the drop in prices was not computed.

Receipts minus expenses give the return for the operator's labor and management and for his capital. If from this is deducted the value of his labor, the result is "Return on Investment". This includes management. The

Table 26. - Distribution of average cash receipts and expenditures per ranch, on different classes of ranches, western North Dakota, 1931 and 1932

Item	Class A ranches		Class B ranches		Class C ranches		All ranches 1/	
	1931	1932	1931	1932	1931	1932	1931	1932
Ranches Number	17	15	5	5	12	9	35	30
Cash receipts	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.
Sales of cattle, crops, and miscellaneous	5,249	3,289	7,361	5,076	3,346	2,281	5,037	3,394
Sales of land, machinery, etc.	79	46	-	-	-	2	38	23
Total	5,328	3,335	7,361	5,076	3,346	2,283	5,075	3,417
Cash expenditures								
Livestock purchased	861	227	1,184	129	778	10	855	148
Cash operating expenses	3,061	2,649	6,270	5,548	2,024	1,761	3,285	2,987
Interest paid	245	295	1,384	1,712	402	393	491	590
Land purchased	129	27	-	226	336	-	178	51
Improvements made	90	81	30	45	21	-	55	48
Machinery and equipment purchased	183	107	27	111	110	15	153	76
Total	4,569	3,386	8,895	7,771	3,671	2,179	5,017	3,900
Cash receipts less cash expenditures	759	-51	-1,534	-2,695	-325	104	58	-482

1/ Includes one ranch not included in any class.

Table 27. - Distribution of ranches by specified amounts of cash receipts minus cash expenditures, by class of ranch, western North Dakota, 1931 and 1932

Amount of cash receipts minus cash expenditures 1/	Class A ranches		Class B ranches		Class C ranches		All ranches 2/	
	1931	1932	1931	1932	1931	1932	1931	1932
Dollars	Number	Number	Number	Number	Number	Number	Number	Number
2,000 and more	4	2					4	2
1,000 to 1,999	3	2		1	2	2	5	5
500 to 999					1	1	2	1
200 to 499	3	1	1			4	4	5
0 to 199	1	2			3	1	4	3
0 to -199		1					0	1
-200 to -499	1				2		3	0
-500 to -999	3	2	1		1		5	2
-1,000 to -1,999	1	4		1	1		2	6
-2,000 and more	1	1	3	3	2	1	6	5
Total	17	15	5	5	12	9	35	30

1/ Minus sign preceding figures indicates a loss.
2/ Includes one ranch not included in any class.

return on investment has been computed in two ways. In the first the cattle were inventoried at the same price per head at the beginning and end of the year. In the second way the cattle were inventoried at market price at the beginning and end of each year. The returns on the total ranch investment and on the operator's equity in this investment have been computed.

The average return on investment on all ranches was 1.4 percent in 1931 and 4.4 percent in 1932 disregarding the lower value of cattle at the end of the year (table 28). After taking this into account the average return was less than nothing or -4.5 and -3.1 percent for the 2 years respectively. The average ranch in 1931 received $4,405 from the sale of cattle and increased its herd by $2,097 worth, using the same price per head at the beginning and end of year. The market price declined, however, so that the cattle on hand at the end of year were worth $2,690 less than the same number would have been at the beginning of the year. This gives -$2,039 as the return on total investment or -4.5 percent. In 1932, the average ranch received $2,970 from the sale of cattle and increased its herd $2,303 worth, using the same price per head at the beginning and end of year. The market price, however, declined during 1932 so that the cattle on hand at the end of the year were worth $3,252 less than the same number would have been worth at the beginning of the year. This gives a return on total investment of -$1,340 or -3.1 percent. The investment in both cases does not include the value of leased land. Cash operating expenses were about 10 percent less in 1932 than in 1931 because less feed was bought and less labor was hired.

Most of the ranches showed a loss in both 1931 and 1932 when cattle were valued at the market price (table 29). The most common ranch return in those years was between -$1,000 and -$2,500 (table 30). Most of these would have shown a small return on investment if it had not been for the drop in cattle prices.

The variation in receipts and expenses is shown in tables 31 and 32. The most common value for cattle sold was from $2,000 to $4,000 per ranch in 1931 and from $1,000 to $2,000 in 1932. Other livestock sales usually amounted to less than $300. This was true of crops also. The increase in cattle inventory was second only to cattle sales in figuring ranch receipts when the drop in price was disregarded. Cattle purchases were a considerable item of expense in 1931 but were much less in 1932. This was also true of purchased feed. There was a wide variation in the amounts spent for labor and for land leases. In 1931 there were four ranches paying out less than $100 for labor and six paying out over $2,000. About 15 percent more months of hired labor were used in 1932 than in 1931 because of more crops to harvest and more cattle. But wages were cut so that the average amount paid for wages was less in 1932 than in 1931. Four ranches in 1931 and three in 1932 paid $1,000 or more in taxes. The most common amount spent for repairs was from $100 to $200. Depreciation, although not a cash expense, must be considered an expense in the long run. On eight ranches this item was $1,000 or more each year.

The ranches that had no investment in land (table 25) made a higher average return on investment than the average ranch when the drop in the price of cattle inventoried was not considered, but made a lower average return when it was considered.

Table 28. - Distribution of receipts and expenses per ranch, average ranch income, and return on investment, by class of ranch, western North Dakota, 1931 and 1932 1/

Item	Unit	Class A ranches		Class B ranches		Class C ranches		All ranches 2/	
		1931	1932	1931	1932	1931	1932	1931	1932
Ranches	Number	17	15	5	5	12	9	35	30
Receipts									
Sales									
Cattle	Dollars	4,390	2,718	6,945	4,817	2,960	2,046	4,403	2,970
Other livestock and livestock products	do	257	222	198	215	138	98	225	202
Crops	do	373	276	176	44	38	7	220	147
Miscellaneous	do	229	73	42	-	210	130	189	76
Increse in inventory									
Cattle 3/	do	1,755	1,558	4,969	5,034	1,559	1,821	2,097	2,303
Other livestock	do	139	142	23	61	32	27	86	89
Crops and feed	do	77	592	-	1,849	345	345	156	726
Total	do	7,220	5,581	12,353	12,020	5,282	4,474	7,376	6,513
Expenses									
Cattle purchased	do	809	179	1,159	93	752	5	816	112
Other livestock purchased	do	52	48	25	36	26	5	39	36
Cash operating expenses									
Feed purchased	do	509	133	646	192	178	52	450	117
Hired labor including board	do	756	641	2,153	1,800	706	500	980	852
Land leased	do	424	472	2,126	2,087	343	389	680	758
Pasturage	do	68	61	51	111	-	-	40	56
Taxes	do	583	554	592	591	351	368	517	516
Gas, oil, and fuel	do	244	306	196	213	131	139	198	238
Seed, twine, and threshing	do	75	234	82	146	57	100	68	188
Repairs on buildings and fences	do	92	44	56	105	41	35	68	51
Repairs on machinery, autos, etc	do	199	114	173	164	154	104	179	118
Miscellaneous	do	111	90	195	139	63	74	105	93
Total cash operating expenses	do	3,061	2,649	6,270	5,548	2,024	1,761	3,285	2,987

Table 28. - Distribution of receipts and expenses per ranch, average ranch income, and return on investment, by class of ranch, western North Dakota, 1931 and 1932 1/ - Continued

Item	Unit	Class A ranches		Class B ranches		Class C ranches		All ranches 2/	
		1931	1932	1931	1932	1931	1932	1931	1932
Expenses - Continued									
Decrease in inventory									
Cattle 3/	Dollars	576	154	-	-	1	-	309	77
Other livestock	do	100	60	173	85	62	41	101	61
Crops and feed	do	1,020	127	1,431	-	280	206	799	125
Depreciation									
On improvements	do	222	217	183	184	175	149	213	206
On machinery and equipment	do	595	621	484	489	432	410	525	537
Value of unpaid family labor	do	292	246	120	72	179	235	224	205
Total ranch expenses	do	6,727	4,301	9,845	6,507	3,931	2,812	6,311	4,346
Total receipts less total expenses	do	493	1,280	2,508	5,513	1,351	1,662	1,065	2,167
Value of operator's labor	do	430	269	328	180	434	282	414	255
Return with cattle inventoried at same value at beginning and end of year									
On total investment	do	63	1,011	2,180	5,333	917	1,380	651	1,912
	Percent	0.1	2.3	5.6	9.3	2.9	4.4	1.4	4.4
On operator's equity 4/	Dollars	-182	716	796	3,621	515	987	160	1,322
	Percent	-0.4	1.8	1.9	9.7	2.0	3.7	0.4	3.7
Decrease in market value of cattle inventoried	Dollars	2,256	2,603	5,523	6,303	1,990	2,429	2,690	3,252
Return with cattle inventoried at market value at beginning and end of year									
On total investment	do	-2,193	-1,592	-3,343	-970	-1,073	-1,049	-2,039	-1,340
	Percent	-4.6	-3.7	-5.6	-1.7	-3.4	-3.3	-4.5	-3.1
On operator's equity 4/	Dollars	-2,438	-1,887	-4,727	-2,682	-1,475	-1,442	-2,530	-1,930
	Percent	-5.5	-4.8	-11.4	-7.2	-5.6	-5.5	-6.6	-5.4

1/ In this table, minus sign preceding figures indicates a loss.

2/ Includes one ranch not included in any class.

3/ Cattle are figured at the same price per head at the beginning and end of each year. These figures largely reflect the changes in the number of cattle. The effect of the drop in cattle prices during each year is reflected in the sales of cattle and in the item "decrease in market value of cattle inventoried". The total effect of this drop in prices was not computed.

4/ Interest paid deducted. (See table 26).

Table 29. - Distribution of ranches by specified range in percentage return on investment and on operator's equity, western North Dakota, 1931 and 1932

Return	Ranches which had specified return on investment when cattle were inventoried at beginning and end of year at -							
	Same value-				Market value-			
	Total investment		Operator's equity		Total investment		Operator's equity	
	1931	1932	1931	1932	1931	1932	1931	1932
Percent 1/	Number	Number	Number	Number	Number	Number	Number	Number
10.0 and over		3	1	4		1		1
8.0 to 9.9	3	2	2	1				
6.0 to 7.9	3	6	3	5				
4.0 to 5.9	1	4		4				
2.0 to 3.9	2	4	3	4	2		2	
0.0 to 1.9	12	6	7	3	2	6	1	3
0.0 to-1.9	7	2	7	4	1	3		5
-2.0 to-3.9	2	3	5	3	10	6	8	
-4.0 to-5.9	3		2	1	8	6	4	6
-6.0 to-7.9	1		2	1	4	5	5	3
-8.0 to-9.9			1		4	1	3	6
-10.0 and over	1		2		4	2	12	6

1/ Minus sign preceding figures indicates a loss.

Table 30. - Distribution of ranches by specified amounts of income and expense per ranch, western North Dakota, 1931 and 1932

Amount	Ranches which had specified amounts of -															
	Receipts less expenses		Value of operator's labor		Interest paid		Decrease in value of cattle in inventory at end of year		Return on investment with cattle inventoried at beginning and end of year at - Same value - Total investment		Same value - Operator's equity		Market value - Total investment		Market value - Operator's equity	
	1931	1932	1931	1932	1931	1932	1931	1932	1931	1932	1931	1932	1931	1932	1931	1932
Dollars 1/	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number
10,000 and over		1						1		1						
7,500 to 9,999	1	1					3	2	1	1		1				
5,000 to 7,499	2	2					1	3	1	1		1				
2,500 to 4,999	1	6			1	2	7	8	2	6	3	6		1		1
1,000 to 2,499	5	8			3	3	16	12	4	6	5	5	1		1	
500 to 999	11	4	3		5	4	6	4	2	5		4	1	1	1	
0 to 499	6	4	32	30	26	21	2		11	4	6	4	2	5	1	3
0 to -499	4								6	2	10	4	1	3	2	3
-500 to -999	4	3							4	2	4	2	3	4	1	4
-1,000 to -2,499	1	1							4	2	7	3	18	11	15	7
-2,500 to -4,999													7	3	10	10
-5,000 to -7,499													2	2	3	2
-7,500 to -9,999															1	
-10,000 and over																

1/ Minus sign preceding figures indicates a loss.

Table 31. - Distribution of ranches by specified amount of receipts per ranch, western North Dakota, 1931 and 1932

Amount	Ranches which had specified amounts for -													
	Sales of -						Increase in inventory:						Total ranch receipts	
	Cattle		Other livestock and livestock products		Crops		Cattle 1/		Crops and feed					
	1931	1932	1931	1932	1931	1932	1931	1932	1931	1932	1931	1932		
Dollars	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number		
None		2	5	6	14	12	7	1	25	6				
1 to 99		1	9	6	3	5			1	4				
100 to 199			3	6	8	6				1				
200 to 299		2	9	6	2	2	1	1	4					
300 to 499			4	4		2	1	2	2	5				
500 to 699	2	1	2		2	2	2	2	1	2				
700 to 999	3	2	3	1	3	1	3	3	1	4				
1,000 to 1,999	9	10		1			9	8		5	1			
2,000 to 3,999	11	3			1		6	7	1	3	13	12		
4,000 to 6,999	3	5					3	5			10	6		
7,000 to 9,999	3	3					3	1			2	7		
10,000 to 14,999	1	1									4	3		
15,000 and over	3										5	2		

1/ Using the same price for cattle at both inventory dates. These reflect the increases in numbers of cattle during the year.

Table 32. - Distribution of ranches by specified amount of expenses per ranch, western North Dakota, 1931 and 1932

Amount	Ranches which had specified amounts for -																							
	Cattle purchased		Cash operating expenses - Feed purchased		Hired labor		Land leased		Taxes		Repairs		Total		Decrease in inventory: Cattle 1/		Crops and feed		Depreciation		Total ranch expenses	
	1931	1932	1931	1932	1931	1932	1931	1932	1931	1932	1931	1932	1931	1932	1931	1932	1931	1932	1931	1932	1931	1932
Dollars	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number
None	11	19	1	3	1	2	2								28	29	10	24						
1 to 99	3	3	8	16	3	2	11	7		1	7	8			1		2	1						
100 to 199	5	3	8	5	3	3	3	4	7	4	11	13					2	1						
200 to 299	1	2	5	2	4	2	4	6	8	4	6	7					2	1	3	1				
300 to 499	2	1	2	4	7	8	1	2	5	6	8	1			2		3	1	6	9				
500 to 699	2	1	3		3	2	3	1	4	9	2			2			3		9	5				
700 to 999	1		2		1	1	4	2	7	3		1	3	1			2		9	7				
1,000 to 1,999	4	1	5		5	6	4	5	4	3	1		16	13	2		8	2	8	8	1	7		
2,000 to 3,999	5		1		8	4	2	2					7	6	1	1	2				16	11		
4,000 to 6,999	1						1	1					3	6	1		1				6	6		
7,000 to 9,999													5	2							4	5		
10,000 to 14,999													1								6	1		
15,000 and over																					2			

1/ Using the same price for cattle at both inventory dates, these largely reflect decreases in cattle numbers during the year.

EXAMPLES OF REPRESENTATIVE RANCHES

The following discussion is an attempt to present a detailed picture of the organization and operation of six representative ranches, three in Class A, one in Class B, and two in Class C. The data for these ranches are given in tables 33, 34, and 35. The above proportion of ranches is approximately the same as that found among the ranches of western North Dakota. That is, the Class C ranches are the most common type whereas Class B ranches are fewest in number.

Class A Ranches
Small Size

Ranch no. 6 is the smallest in cattle numbers of the three ranches selected in Class A group, but is medium in extent of land used. This ranch is located in a rough area for this class of ranches since Class A ranches are those having a relatively large amount of land suitable for growing grain or cultivated crops in proportion to grazing land. The proportion of controlled grazing land to hay and other crop land was about 6 to 1. Forty-six percent of the land was owned, 38 percent was leased, and 16 percent was free range. This is the only ranch of the three in this group which has any free range, the reason being that it is located in a rougher section where land is less valuable. There was no change in the land acreage used during the 2-year period but there was a considerable increase in cattle numbers. Cattle on this ranch totaled 119 on January 1, 1931 and 192 on January 1, 1933, an increase of 61 percent. This increase was largely in cows, 2-year-old heifers, and 2-year-old steers. Cows increased from 64 to 86, 2-year-old heifers from 22 to 27, and 2-year-old steers from 5 to 30. There were 26 yearling steers and heifers in 1931 and 48 in 1932.

The above is a larger percentage increase than is found on any other ranch under discussion here. Apparently the available range or grazing land is the limiting factor in the expansion of cattle numbers. The 7,000 acres of grazing land on this ranch were not fully stocked but are capable of carrying at least 350 head of cattle.

Death losses among cattle have been light, amounting to less than 1/2 of 1 percent annually, compared with a loss of 1.3 percent on the other ranches in this group in 1931. This light death loss can be attributed to the care given to the cattle and to the absence of disease. No labor is hired. The ranch is operated entirely with family labor.

The calf crop on this ranch was 77 percent in 1931 and 64 percent in 1932 (this is also approximately the average for all the ranches in this group). The calf crop could undoubtedly be increased by conditioning the bulls for the breeding season and by the use of breeding pastures. If this is not done more bulls should be used. The number of bulls to cows in 1932 was 1 to 43. Counting yearling heifers subject to breeding the number was 1 to 58. Calf crops of around 85 percent have been obtained on other ranches with this proportion of bulls to cows but only when the bulls were conditioned for the breeding season and breeding pastures were used. Higher calf crops are obtained when heifers are bred to calve at 3 years of age than when they calve as 2-year-olds.

The quality of the cattle is high. Purebred registered bulls have been used for many years and a number of cows are registered. The best bull calves from registered cows are sold for breeding purposes.

In common with most ranches in Class A, this ranch has no definite policy as to age of cattle sold. During 1931 only eight purebred bull calves and yearlings were sold. During 1932, 2-year-old steers were sold. The prices received reflected the high quality of the cattle. The class of cattle sold in the past has been determined largely by market demands and the available feed supply and cost of purchased feed.

Approximately 600 acres of land in 1931 and 500 acres in 1932 were used for growing grain or cultivated crops. The native-hay land was 340 acres each year. One hundred acres of crop land used in 1931 were used as grazing land in 1932 because of its poor quality and weed infestation. The season 1931 was dry and all crops were a failure. The total production on 527 acres seeded to grain and forage crops was 30 tons of hay and 25 tons of corn fodder. During 1932 the yields of grain and forage crops were considerably below the average of the other ranches in this group largely because of the inferior quality of the crop land.

A cropping system that includes sweetclover and summer fallow in rotation would increase crop yields on this ranch by eliminating weeds and improving the soil. Paying crops of sweetclover would not be produced every year but with the low prices of sweetclover seed that then prevailed the seeding of this crop with grain on well-prepared land would be justified in the number of paying crops that would be produced. The adoption of the rotation system recommended elsewhere in this report for Class A ranches would be an improvement over the cropping system used and would insure a more dependable feed supply. During 1931 not enough feed was produced to winter the cattle on hand as the quantity of roughage raised was only equal to 0.56 ton per head of cattle wintered. During 1932 the production was 0.63 ton per head. Had no roughage been carried over from preceding years the quantity raised would have been insufficient both years to carry the cattle through the winter, particularly since the class of cattle wintered all required some feeding. The quantity of roughage actually fed was approximately one ton per head in 1931 and 0.92 ton in 1932. In addition 124 pounds of concentrates per head were fed in 1931 and 94 pounds in 1932.

The total cash receipts from this ranch in 1931 were $1,070, and the cash operating expenses were $1,176. There was a considerable increase in cattle numbers and value during the year, amounting to $2,105, and an increase in the value of other livestock amounting to $85. This added to the cash receipts increased the total ranch receipts to $3,260 for the year.

Deduct the cost of livestock bought	$ 184
Enter the decrease in the value of feed on hand at the end as compared with the beginning of the year amounting to	515
And the estimated depreciation in value of machinery and improvements,	812
Making a total of	$1,511
This added to the cash operating expenses of	1,176
Makes a total of	$2,687
Add the value of unpaid family labor amounting to	600
Gives a total ranch expense of	$3,287

Table 33. - Organization of selected ranches, western North Dakota, 1931 and 1932

Item	Unit	Class A ranches					
		Ranch no. 6		Ranch no. 5		Ranch no.24	
		1931	1932	1931	1932	1931	1932
Land used	Acres	7,840	7,840	6,400	6,400	20,770	22,165
Cattle on hand January 1	Number	119	171	488	418	963	1,109
Cattle on hand December 31	do	171	192	418	352	1,109	1,137
Total investment on January 1	Dollars	36,680	36,305	70,918	66,061	69,619	71,152
Age of cattle sold	Years	1/	2	1,2 & 3	1 & 3	3 & 4	3 & 4
Calves weaned per 100 cows	Number	77	64	71	73	82	73
Total cattle lost (except calves)	do	-	1	8	6	22	63
Crops harvested	Acres						
Native hay	do	125	120	-	50	160	350
Tame hay	do	-	-	15	50	-	20
Grain hay	do	100	45	212	135	452	280
Corn fodder	do	40	10	-	-	18	60
All roughage	do	265	175	329	332	660	734
Oats	do	60	10	-	-	20	48
Barley	do	12	25	-	50	-	-
Wheat	do	315	155	-	95	-	120
All grains	do	387	230	-	145	20	233
All crops	do	652	405	499	632	680	967
Total roughage raised	Tons	95	121	453	710	445	654
Roughage raised per head of cattle to be wintered	do	.56	.63	1.08	2.02	.40	.58
Roughage fed per head of cattle	do	1.09	.92	.86	1.71	.24	.35
Concentrates fed per head of cattle	Pounds	124	94	537	652	29	48
Land used that was owned by operator	Percent	46	46	60	60	10	15
Land used per head of cattle	Acres	66	46	13	15	22	20
Value of labor per head of cattle	Dollars	8.22	6.59	5.57	4.46	3.54	2.28

Table 33. - Organization of selected ranches, western North Dakota, 1931 and 1932 - Continued

Item	Unit	Class B ranch		Class C ranches			
		Ranch no. 45		Ranch no. 12		Ranch no. 2	
		1931	1932	1931	1932	1931	1932
Land used	Acres	11,400	11,400	3,840	3,840	10,640	10,960
Cattle on hand January 1	Number	551	652	185	210	561	751
Cattle on hand December 31	do	652	799	210	200	751	795
Total investment on January 1	Dollars	49,995	51,120	35,313	33,505	54,929	60,367
Age of cattle sold	Years	1,2 & 3	3	1	2/ 1	3/3 & 4	3 & 4
Calves weaned per 100 cows	Number	66	50	88	85	76	82
Total cattle lost (except calves)	do	8	7	3	5	5	41
Crops harvested	Acres						
Native hay	do	75	450	30	45	-	-
Tame hay	do	-	-	120	120	-	30
Grain hay	do	100	150	38	20	410	425
Corn fodder	do	-	-	-	-	50	100
All roughage	do	175	600	188	225	510	635
Oats	do	-	35	-	-	-	-
Barley	do	40	-	-	-	-	-
Wheat	do	115	200	-	-	40	-
All grains	do	200	235	2	-	40	-
All crops	do	375	835	190	225	550	635
Total roughage raised	Tons	85	500	90	218	795	709
Roughage raised per head of cattle to be wintered	do	.13	.63	.43	1.09	1.06	.89
Roughage fed per head of cattle	do	.85	.63	.69	1.03	.31	1.61
Concentrates fed per head of cattle	Pounds	86	88	165	89	127	16
Land used that was owned by operator	Percent	9	9	79	79	40	42
Land used per head of cattle	Acres	21	17	21	18	19	15
Value of labor per head of cattle	Dollars	4.37	3.47	4.67	2.81	3.70	1.82

1/ No cattle sold.

2/ Some calves sold also.

3/ Some spayed heifers sold also.

Table 34. - Distribution of investment, cash receipts, and cash expenditures per ranch on selected ranches, western North Dakota, 1931 and 1932

Item	Class A ranches						Class B ranch		Class C ranches			
	Ranch no. 6		Ranch no. 5		Ranch no. 24		Ranch no. 45		Ranch no. 12		Ranch no. 2	
	1931	1932	1931	1932	1931	1932	1931	1932	1931	1932	1931	1932
Investment January 1	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Land 1/	18,200	18,200	30,720	30,720	10,400	11,800	10,000	10,000	15,200	15,200	12,720	13,520
Buildings	5,795	5,511	10,700	10,337	3,275	3,122	9,250	9,042	6,470	6,248	11,300	11,081
Machinery and equipment	2,965	2,437	4,535	4,285	4,475	4,440	3,500	2,876	1,905	1,537	2,203	1,852
Range cattle	6,170	7,037	19,680	15,188	45,185	45,002	23,340	25,970	9,450	8,625	25,040	27,602
Other livestock	2,020	2,105	1,115	1,150	1,614	1,410	860	840	553	496	735	840
Feed and supplies	1,530	1,015	4,168	4,381	4,670	5,378	3,045	2,392	1,735	1,399	2,931	5,472
Total investment	36,680	36,305	70,918	66,061	69,619	71,152	49,995	51,120	35,313	33,505	54,929	60,367
Indebtedness	5,250	6,610	10,000	10,000	10,300	12,140	725	-	-	-	-	750
Operator's equity	31,430	29,695	60,918	56,061	59,319	59,012	49,270	51,120	35,313	33,505	54,929	59,617
Cash receipts												
Sales												
Range cattle	565	1,730	16,227	8,960	9,483	8,526	3,483	525	1,958	2,372	4,713	3,739
Other livestock and livestock products	-	100	126	28	267	45	45	-	10	23	-	-
Crops	156	191	2/ 587	113	154	126	-	-	9	-	-	20
Machinery and equipment	-	150	550	-	-	-	-	-	-	14	-	-
Land	-	-	-	-	800	-	-	-	-	-	-	-
Miscellaneous	349	-	-	-	26	20	-	-	198	-	-	-
Total cash receipts	1,070	2,171	17,490	9,101	10,730	8,717	3,528	525	2,175	2,409	4,713	3,759
Cash expenditures												
Cattle purchased	175	56	2,970	635	2,177	242	-	-	40	-	2,595	-
Other livestock purchased	9	11	-	-	22	-	-	-	-	-	50	20
Cash operating expenses	1,176	1,398	9,734	4,677	8,147	5,979	5,803	4,115	1,044	1,029	4,544	3,581
Interest paid	459	399	593	550	652	1,252	58	600	23	-	25	99
Land purchased	-	-	-	-	2,200	-	-	-	-	-	800	-
Improvements made	-	11	-	-	-	-	-	-	-	-	-	-
Machinery and equipment purchased	-	250	966	-	938	175	60	65	-	136	235	-
Total cash expenditures	1,819	2,125	14,263	5,862	14,136	7,648	5,921	4,780	1,107	1,165	8,249	3,700
Cash receipts minus expenditures	-749	46	3,227	3,239	-3,406	1,069	-2,393	-4,255	1,068	1,244	-3,536	59

1/ Does not include leased land.
2/ Twenty tons of cottonseed cake were resold for $587.

Deducting this amount from the total ranch receipts of $3,260 leaves a balance of $27 on the loss side. Deducting $360, the estimated value of the operator's labor, gives -$387 as the total return on the investment for 1931. Using the same calculations for 1932 the ranch showed a loss of $1,022.

The amount of labor used per head of cattle handled was the highest of any ranch under discussion. The estimated value of this labor was $8.22 per head in 1931 and $6.59 per head in 1932. This was all family labor and many more cattle could undoubtedly have been handled with the same amount of labor if this were the only consideration involved.

In these calculations all cattle on hand at the end of the year have been valued at the same price per head for each class as at the beginning. That is, if cows were valued at $40 and yearlings at $30 per head on January 1, 1931 these same values were used at the end of the year. Young cattle have been increased in value through growth. Calves become yearlings, yearlings become 2-year-olds, etc., during the year, and have been increased in value accordingly. The drop in market values of cattle during the year is shown for the cattle on hand at the end of the year in "Decrease in market value of cattle inventoried." It is also reflected in the sales of cattle. Had the drop in cattle inventoried been taken into account this ranch would have shown a loss of $1,625 during 1931 and a loss of $2,353 during 1932.

Medium Size

Ranch no. 5, another of the class A ranches, is medium in size as regards cattle numbers but is smallest in number of acres of land used. It is located in a district having high-grade grazing and crop land. The proportion of grazing land to hay and other crop land was about 8.3 to 1. Only about 7 percent of the hay and other crop land was in native hay. The crop land on which feed can be grown is nearly all bottom land and is highly productive as compared with crop land used by other ranches in this group. Grazing is relatively less important on this ranch than on other ranches of this class and more dependence is placed upon farm-raised feeds. There was no change in the land acreage used during the 2-year period. Sixty percent of the land was owned and 40 percent was leased.

This ranch decreased the cattle numbers, during the 2-year period, from 488 to 352 head; the decrease was all in young cattle. Cows were increased 35 percent. This ranch made a practice of selling fat long-aged yearlings in the fall. In addition to the calves raised a considerable number of calves are usually bought each fall, or yearlings are bought in the spring. During the fall of 1932 only about one-fourth as many were purchased as during the previous fall.

In contrast to most ranchmen this operator has a definite policy of beef cattle production and marketing which is followed consistently from year to year. The breeding herd is handled in the customary way and the calf crop is only slightly above the average. Calves are weaned about October 20 and cows are then turned on winter pasture where they are fed as needed during the winter. After being weaned, the calves are run on separate pasture and are fed hay and 2 pounds of grain daily. This grain ration is increased to 3 pounds per head and a small quantity of silage is added January 1. The ration

Table 35. - Distribution of receipts and expenses, ranch income and return on investment, by selected ranches, western North Dakota, 1931 and 1932 1/

Item	Class A ranches						Class B ranch		Class C ranches			
	Ranch no. 6		Ranch no. 5		Ranch no. 24		Ranch no. 45		Ranch no. 12		Ranch no. 2	
	1931	1932	1931	1932	1931	1932	1931	1932	1931	1932	1931	1932
	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.
Receipts												
Sales												
Range cattle	565	1,730	16,227	8,960	9,483	8,526	3,483	525	1,958	2,372	4,713	3,739
Other livestock and livestock products	-	100	126	28	267	45	45	-	10	23	-	-
Crops and miscellaneous	505	191	787	113	180	146	-	-	207	-	-	20
Increase in inventory												
Range cattle 2/	2,105	808	-	-	7,585	1,969	6,415	8,136	870	357	5,921	2,082
Other livestock	85	-	40	120	-	40	-	-	-	-	120	40
Crops and feed	-	-	213	-	708	1,345	-	323	-	-	2,541	-
Total ranch receipts	3,260	2,829	17,393	9,221	18,223	12,071	9,943	8,984	3,045	2,752	13,295	5,881
Expenses												
Cattle purchased	175	56	2,970	635	2,177	242	-	-	40	-	2,595	-
Other livestock purchased	9	11	-	-	22	-	-	-	-	-	50	20
Cash operating expenses												
Feed purchased	218	108	3/2,067	491	1,253	37	1,205	18	276	56	-	127
Hired labor including board	18	27	2,404	1,683	2,446	1,754	1,882	1,725	284	311	1,593	1,068
Land leased	90	270	663	231	2,451	2,476	1,372	1,296	37	37	552	480
Pasturage	-	-	720	-	-	-	-	-	-	-	-	-
Taxes	532	313	1,176	1,180	702	603	496	511	230	349	1,324	1,146
Gas, oil, and fuel	88	188	546	710	455	316	394	473	59	68	138	114
Seed, twine, and threshing	9	195	217	130	191	325	83	-	-	-	199	194
Repairs on buildings and fences	9	62	412	32	25	-	61	-	35	33	3	65
Repairs on machinery, autos, etc.	161	152	845	87	494	186	132	37	53	94	554	191
Miscellaneous	51	83	684	133	130	282	178	55	70	81	181	196
Total cash operating expenses	1,176	1,398	9,734	4,677	8,147	5,979	5,803	4,115	1,044	1,029	4,544	3,581
Decrease in inventory												
Range cattle 2/	-	-	2,570	2,312	-	-	-	-	-	-	-	-
Other livestock	-	170	5	80	204	-	20	30	57	16	15	30
Crops and feed	515	11	-	1,594	-	-	653	-	336	194	-	1,284
Depreciation												
On buildings	284	284	363	363	153	153	208	208	222	202	219	219
On machinery and equipment	528	821	866	866	973	991	684	672	368	377	586	528
Value of unpaid family labor	600	900	315	180	360	420	600	360	180	160	-	-
Total ranch expenses	3,287	3,651	16,823	10,707	12,036	7,785	7,968	5,385	2,247	1,978	8,009	5,662

Table 35. - Distribution of receipts and expenses, ranch income and return on investment by selected ranches, western North Dakota, 1931 and 1932 1/ - Continued

Item	Unit	Class A ranches						Class B ranch		Class C ranches			
		Ranch no. 6		Ranch no. 5		Ranch no. 24		Ranch no. 45		Ranch no. 12		Ranch no. 2	
		1931	1932	1931	1932	1931	1932	1931	1932	1931	1932	1931	1932
Total receipts minus total expenses	Dol.	-27	-822	570	-1,486	6,187	4,286	1,975	3,599	798	774	5,286	219
Value of operator's labor	do	360	200	-	-	600	360	200	180	400	120	480	300
Return with cattle inventoried at same value at beginning and end of year													
On total investment	do	-387	-1,022	570	-1,486	5,587	3,926	1,775	3,419	398	654	4,806	-81
	Pct.	-1.1	-2.8	0.8	-2.2	8.0	5.5	3.6	6.7	1.1	2.0	8.7	-0.1
On operator's equity 4/	Dol.	-846	-1,421	-23	-2,036	4,935	2,674	1,717	2,819	375	654	4,781	-180
	Pct.	-2.7	-4.8	5/	-3.6	8.3	4.5	3.5	5.5	1.1	2.0	8.7	-0.3
Decrease in market value of cattle inventoried	Dol.	1,238	1,331	1,922	1,746	7,768	7,599	5,785	4,876	1,695	1,987	3,359	3,833
Return on investment with cattle inventoried at market value at beginning and end of year													
On total investment	Dol.	-1,625	-2,353	-1,352	-3,232	-2,181	-3,673	-2,010	-1,457	-1,297	-1,333	1,447	-3,914
	Pct.	-5.2	-6.5	-1.9	-4.9	-3.1	-5.2	-4.0	-2.9	-3.7	-4.0	2.6	-6.5
On operator's equity 4/	Dol.	-2,084	-2,752	-1,945	-3,782	-2,833	-4,925	-2,068	-2,057	-1,320	-1,333	1,422	-4,013
	Pct.	-6.6	-9.3	-3.2	-6.7	-4.8	-8.3	-4.2	-4.0	-3.7	-4.0	2.6	-6.7

1/ In this table, minus sign preceding figures indicates a loss.

2/ Using the same price for cattle at the beginning and end of the year. These figures largely reflect changes in the number of cattle during the year. The effect of the drop on cattle prices during each year is reflected in the sales of cattle and in the item "decrease in market value of cattle inventoried." The total effect of the drop on prices was not computed.

3/ Twenty tons of cottonseed cake were resold for $587, leaving a balance of $1,480 as the cost of feed used on the ranch.

4/ Interest paid deducted. (See table 34). 5/ Less than -0.1 percent.

of ground grain (mostly barley and screenings), hay, and 10 pounds of silage per head, is fed usually until May 1, when the cattle are turned on pasture for the summer. During the early part of September the yearlings are turned into standing corn in addition to the pasture, and are usually grazed in corn until November 1 when they are taken up and fed ground barley, wheat, and cottonseed cake, approximately 4 pounds per head daily for 30 days. They are shipped to market early in December.

The average weight of 193 mixed yearlings (steers and heifers) early in December was 872 pounds per head at the terminal market. This is approximately 200 pounds more than similar cattle would weigh off the grass without any grain supplement to the ration. This was a year of low cattle prices and the price received was approximately $1 per hundred pounds more than like cattle brought directly off the grass, and the price per head was approximately 50 percent higher than similar cattle brought when shipped directly off the grass.

Whether feeding cattle for the market in the range country is a profitable practice is a debatable question. Much depends on the individual ranch lay-out, such as the proportion of land suitable for growing grain or cultivated crops to grazing land, cost of grazing land, and the quality or productivity of the available crop land. Price relationships between grass-fed and grain-fed cattle are also factors, and finally the individual ranchman's inclinations and capabilities. Observations indicated that, if any type of cattle feeding can be carried on profitably in the range country over a series of years, the system outlined above or some modification of it stands the best chance of success.

On ranch no. 5, the total amount of land used for growing grain or cultivated crops that was owned was 500 acres. Normally wheat, oats, and barley are raised for grain. During 1931 all grain was cut for hay. The production was 1.1 tons per acre. Approximately 44 percent of the acreage used was in corn and the remainder was in grain, hay, and millet. The total production of roughage was much less than the quantity fed during the succeeding winter. No grain was produced in 1931 but 3,730 bushels were fed in addition to 14 tons of screenings and 18 tons of cottonseed cake. The total cost of all feed bought for use on the ranch was $1,480. Without showing a complete financial statement, the year's operations calculated in the same way as for ranch no. 6 showed a profit of $570 for the year. During 1932, 1,140 bushels of wheat were produced on 95 acres, and 950 bushels of barley on 50 acres - a total production of 2,090 bushels of grain. Meanwhile 3,487 bushels of grain and 35 tons of screenings were fed. The cost of purchased feed in 1932 was $491.

The ranch lost $1,486 during 1932. The poorer showing of that year is attributed to lower prices received for cattle. The value of labor per head of cattle handled was $5.57 in 1931 and $4.46 in 1932. Taking account of the drop in market value of the cattle on hand at the end of the year, the ranch would have sustained a loss of $1,352 in 1931 and a loss of $3,232 in 1932.

Large Size

Ranch no. 24, another of the Class A ranches, is one of the largest ranches involved in the study as regards both cattle numbers and acreage of land used. Total land acreage used was 20,770 acres in 1931 and 22,165 in 1932. The cattle numbers were 963 on January 1, 1931 and 1,137 on January 1, 1933.

In common with other ranchmen operating on the Fort Berthold Indian Reservation, this ranchman owns a relatively small percentage of the land used. The owned land was increased from 10 percent of the total land used in 1931 to 15 percent in 1932 through the purchase of additional land adjoining the home ranch. The extent of land used per head of cattle on hand January 1 was 22 acres in 1931 and 20 acres in 1932. The proportion of grazing land to land used for growing grain or cultivated crops was approximately 24.6 to 1. Largely because of a relatively high percentage of grazing to available crop land, this operator makes a practice of selling 3- and 4-year-old steers, a class of cattle requiring little supplementary winter feeding when ample range is available. Grass-fat steers and dry cows are marketed in the fall.

The quantity of feed fed per head of cattle handled was 0.24 ton of roughage and 29 pounds of concentrates in 1931 and 0.35 ton of roughage and 48 pounds of concentrates in 1932. This was the smallest quantity of supplementary winter feed used by any of the ranches under discussion and indicated a maximum use of grazing land and the handling of a large percentage of big steers.

This ranch presents a good illustration of the ways in which ranchmen adjust their operations to declining cattle prices and accompanying low returns. The most common practice is to reduce operating costs to a minimum. Sometimes this is carried to extremes as in the case of winter feed supplies reduced to a point below necessary requirements to maintain cattle in strong thrifty condition throughout the winter. Reduction in the labor supply has often resulted in death loss among cattle through neglect at critical periods. The operating expenses (which include labor, purchased feed, leased land, taxes, gas and oil, seed and threshing, repairs and miscellaneous) were reduced on this ranch from $8.46 per head of cattle handled in 1931 to $5.39 per head in 1932. The items largely within the operator's control, such as feed, labor, gas and oil, seed and threshing, repairs, and miscellaneous, were reduced 42 percent whereas the items largely outside of the ranchman's control, such as taxes and leases, were reduced very little. The value of labor alone per head of cattle handled was reduced from $3.54 in 1931 to $2.28 in 1932. In addition to the above items there was a big decrease in the quantity of purchased feed from 1931 to 1932. This decrease is attributable to seasonal weather conditions rather than to management.

The season of 1931 was dry and where no feed reserves were available it was necessary to buy large quantities of winter feed. The season of 1932 was favorable for feed production. Normally the expenditures for repairs on machinery, buildings, and fences make up a considerable part of the operating expense. The reduction of expenditures for these items during the years of stress is in reality not savings but merely postponement of necessary expenditures until some future time when these repairs must be made or the buildings and equipment are allowed to deteriorate permanently. In common with a big majority of ranchmen this operator increased his cattle numbers during the period of declining prices. This increase amounted to 18 percent in the 2-year period from January 1, 1931 to January 1, 1933. This is less than the average increase for the entire group of ranches under discussion.

The production of feed crops per head of cattle handled on this ranch is considerably below the average for the ranches involved in the study. The total

production of roughage in 1931 was 0.40 ton per head of cattle on hand January 1 and in 1932 it was 0.58 ton. The roughage produced was largely grain hay with some wild hay produced in favorable seasons. The feed grain produced, mainly oats, was insufficient to meet requirements for concentrates, and heavy purchases of oats and cottonseed cake were made in 1931. During 1932, which was a favorable crop season, 233 acres of grain of all kinds were threshed. Of this amount 120 acres were wheat to be sold as a cash crop.

With the relatively small extent of crop land available on this ranch a cropping system should be adopted to produce feed for livestock rather than a combination of cash crop and feed production as in the past. The adoption of a rotation system as outlined elsewhere in this report will insure a more dependable feed supply than can be expected with the cropping system previously followed. More liberal winter feeding in this case, particularly to cows and calves, will reduce death losses in severe winters and increase the profits of the ranch.

The total cash receipts from this ranch for 1931 were $9,930, of which all but 4 percent was from the sale of range cattle. There was a considerable increase in cattle numbers during the year, some of which were raised and some bought. This increase in cattle numbers and value, plus a small increase in crops and feed on hand brought the total ranch receipts up to $18,223 for the year.

The cost of livestock bought which amounted to	$ 2,199
and the decrease in the value of livestock other than cattle amounting to	204
and estimated depreciation in the value of machinery and improvements of	1,126
and cash operating expense amounting to	8,147
Make a total of	$11,676.

Deducting this amount from the total ranch receipts of $18,223 leaves a balance on the profit side of $6,547. Deducting the estimated value of family labor of $360 leaves a net profit of $6,187 for the year, and deducting $600, the estimated value of the operator's labor, gives $5,587 as the total return on the investment for 1931. Using the same calculations for 1932, the ranch showed a total return on investment of $3,926 for that year. This decrease is entirely attributable to the lower cattle prices prevailing that year. The reduction in operating expenses stated above was not sufficient to offset the lower cattle prices received in 1932.

The drop in the market value of cattle after January 1, 1931 has not been taken into consideration in the above calculations. Had the drop in market value of cattle on hand December 31, 1931 been taken into account, this ranch would have shown a loss of $2,181 for 1931 and, using the same calculations for 1932 and taking into account the drop in market values from January 1, 1932 to December 31, 1932 of all cattle on hand at the close of the year, the loss for 1932 would have been $3,673.

Class B Ranches

The ranches in Class B differ mainly from those of the other two classes in having dependable hay meadows on bottom lands and a relatively small amount of owned grazing land. This group of ranches on the Indian reservation lease nearly all the grazing land they use. The wild or tame grass meadows on river flats were a cheap source of winter feed except in the very driest seasons like 1931.

Ranch no. 45 is medium in size for the group. The total land used during the 2-year period was 11,400 acres, of which 91 percent was leased and 9 percent owned. The proportion of grazing land to hay and other crop land was approximately 9.8 to 1. There was no change in the land acreage used during the 2-year period. Cattle numbers were increased, however, from 551 head on January 1, 1931 to 799 head on January 1, 1933. The number of acres of land used per head of cattle on hand January 1 was 21 acres in 1931 and 17 acres in 1932. The calf crop raised was low on this ranch in common with most reservation outfits, being 66 percent in 1931 and 50 percent in 1932. Low calf crops constituted one of the results of running breeding herds under semi-open range conditions. By the use of breeding pastures calf crops can undoubtedly be increased.

This operator until recently has made a practice of selling 3- and 4-year-old steers. During the period of declining cattle prices, yearlings, and 2- and 3-year-olds were sold. One lot of 2-year-old steers were grain-fed for the market but owing to declining bbeef prices during the feeding period this did not prove a profitable practice. This operator has decided to confine himself to the sale of aged grass-fat steers as the most profitable practice, considering the conditions under which he operates.

Wild hay is the most important winter feed on this ranch. In addition, some grain hay is raised each year. The season of 1931 was one of the most unfavorable on record for the production of crops of all kinds and the production of roughage that year equaled 0.13 ton per head of cattle handled. This is the lowest per head production recorded by any of the ranches discussed. During 1932 the production was 0.63 ton per head. The quantity of roughage fed was 0.85 ton per head in 1931 and 0.63 ton in 1932. Concentrates fed equaled 86 pounds per head in 1931 and 88 pounds in 1932.

This operator made a practice of devoting most of his cultivated crop land to wheat production. This may have been a profitable practice when wheat prices were high relative to feed-grain prices. With price relationships then prevailing between wheat and coarse grain it is doubtful whether the production of wheat for sale and the purchase of the necessary feed grain was a profitable practice. Since all the crop land available appeared to be needed for the production of roughage and concentrates properly to winter the cattle then on hand, it would seem to have been a good policy to devote the crop land to the production of feed rather than to cash crops.

The total cash receipts from this ranch in 1931 were $3,528 of which $3,483 was from sales of range cattle and $45 from the sale of other livestock. The increase in numbers and value of cattle on hand at the end of the year amounted to $6,415, making total ranch receipts of $9,943 for the year.

The cash operating expense was $5,803 of which 77 percent was for hired labor, purchased feed, and leased land. No livestock was bought during the year,

There was a decrease in the value of livestock other than cattle during

the year amounting to	$ $20
and decrease in the value of feed on hand	
during the year of	653
and estimated depreciation in the value of	
machinery and improvements of	892
Making a total of	$1,565
This added to the cash operating expense of	5,803
Makes a total of	$7,368

Deducting this from the total ranch receipts of $9,943 leaves a profit of $2,575. Deducting from this the value of family labor of $600 leaves a net balance on the profit side of $1,975. Deducting $200, the estimated operator's labor, gives $1,775 as the total return on the investment for the year 1931.

During 1932 only a few 3-year-old steers were sold netting $525. Increase in the value of feed on hand at the end as compared with the beginning of the year was $323. The increase in cattle value amounted to $8,136, making total ranch receipts of $8,984. The total operating expense that year was $4,115, or $1,688 less than the previous year although considerably more cattle were handled than in 1931. The value of labor was $4.87 per head of cattle handled in 1931 and $3.47 in 1932. Total ranch expense in 1932 was $5,385. Deducting this from the total ranch receipts leaves a profit of $3,599 for the year, but deducting $180, the estimated value of the operator's labor, gives $3,419 as the total return on the investment for the year 1932. Deducting the drop in market values of cattle on hand at the end of each year, this ranch would have lost $2,010 in 1931 and $1,457 in 1932.

Class C Ranches
Small Size

Class C ranches are located in the Little Missouri Bad Lands. All ranches in this group have grazing land in the Bad Lands proper with their crop land located either in the Bad Lands or on the adjacent rolling lands. The best hay lands are located on the flats of the Little Missouri River or on the creek flats tributary to the Little Missouri.

Ranch no. 12 is a good example of a well-managed small ranch located in the heart of the Bad Lands. All available land suitable for growing grain or cultivated crops is located on the Little Missouri flats and all is devoted to the production of feed for livestock. The total land used during the 2-year-period was 3,840 acres, of which 79 percent was owned and 21 percent leased. The ratio of controlled grazing land to hay and other crop land was 8.8 to 1.

The cattle numbers were 185 on January 1, 1931 and 200 on January 1, 1933. The acreage of land used per head of cattle handled was 21 acres in 1931 and 18 acres in 1932.

This ranchman has adopted many of the approved management practices recommended by the best operators. His range is not overgrazed, and as a result his cattle go into the winter in good condition and his winter death losses are light. He is liberal in the use of winter feed. During 1931 this operator fed 0.69 ton of roughage and 165 pounds of concentrates per head of cattle handled. During 1932 the quantity of roughage fed was 1.03 tons, and of concentrates 89 pounds, per head. Less than a normal quantity of roughage was fed during 1931 because of the shortage of feed that year due to the drought. The quantity of roughage and concentrates fed during 1932 conforms with the usual practice on this ranch.

Heifers are bred to calve at 3 years of age, the bulls are conditioned for the breeding season, and the breeding herd is run in small pastures. As a result calf crops have been high, being 88 percent in 1931 and 85 percent in 1932. To fully utilize the range that lies farther back from the river than the cattle will travel in summer, this ranchman has sunk an artesian well which provides a dependable water supply. Normally yearlings are sold in the fall. In most years they are sold to feeders who buy them at the ranch. Prices received have been above the average both because of the quality of cattle and because they have carried more flesh at marketing time than the average run of yearlings. This policy of selling yearlings is undoubtedly sound for this operator, since his range is limited and winter feed supplies (except grain) are usually sufficient to feed all cattle that require feeding. Calves are fed liberally both hay and grain, from weaning time throughout the winter. Cows are grazed and fed in addition as needed to keep them in strong, thrifty condition through the winter. Bulls are separated from the cow herd in the fall and are fed liberally through the winter and early spring, and are turned in with the cow herd about July 1.

No cash crops are produced. Approximately 80 percent of the hay and other crop land is in alfalfa and 20 percent is devoted to grain hay. In addition wild hay is cut during favorable seasons. The average yield of all hay in 1931 was 0.48 ton per acre and approximately one ton per acre in 1932. Some grain was bought but during normal years this class of feed does not exceed 100 pounds per head.

Total cash receipts for 1931 were $2,175, of which 90 percent was from the sale of range cattle and 10 percent from all other sources. There was an increase in the numbers and value of cattle during the year amounting to $870, making total ranch receipts of $3,045.

The cash operating expense was $1,044 for the year. Of this amount 76 percent was for the items of hired labor, purchased feed, and taxes.

Cattle bought during the year amounted to	$ 40
and decrease in the inventory values of livestock other than cattle	57
and decrease in the value of feed on hand at the end of year	336
and estimated depreciation of machinery and improvements was	590
making a total of	$1,023
Add to this the cash operating expenses of	1,044
makes a total of	$2,067
Deducting this from the total ranch receipts of $3,045 leaves a balance on the profit side of	978
Deducting the estimated value of family labor of	180
leaves a net profit for the year of	$ 798
Deducting the estimated value of the operator's labor of	400
leaves a total return on investment for the year 1931 of	$ 398

Taking into account the drop in the market values, during the year, of the cattle on hand, this ranch would show a loss of $1,297 in 1931. Using the same calculations for 1932 the ranch shows a total return on investment of $654 before making the deductions for the drop in market values and a loss of $1,333 after taking the drop into account.

Medium to Large Size

Another ranch of the Bad Lands differs from the one just described in having a considerable acreage of good-quality crop land on the rolling plateau adjacent to the Bad Lands proper. The ranch is above the average in size. Total land used was 10,640 acres in 1931 and 10,960 acres in 1932; 40 percent of the land was owned in 1931 and 42 percent in 1932. The owned land was increased through the purchase of 320 acres of county-tax-deed land during 1932. The number of acres of land used per head of cattle handled was 19 in 1931 and 15 in 1932. The ratio of controlled grazing land to land suitable for growing grain or cultivated crops was 19.8 to 1. Cattle numbers were increased from 561 on January 1, 1931 to 795 on January 1, 1933.

This ranch had the lowest average labor cost per head of cattle handled for the 2-year period of any of the six ranches described. The total labor for 1931 was $3.70 and for 1932 it was $1.82, an average of $2.76 per head per year. The relatively high labor cost for 1931 can be explained by the fact that more than an average quantity of winter feed was harvested that year — 1.06 tons per head of cattle on hand. This was a dry season and a large acreage was covered to obtain this quantity of roughage and the labor cost was correspondingly high. During 1932, a good crop year, the labor cost for feed production was relatively low. Only 0.89 ton of roughage per head of cattle handled was harvested and wages were lower than during the preceding year.

The feed used during 1931 was only 0.31 ton of roughage and 127 pounds of concentrates per head of cattle on hand. A large quantity of roughage was carried over to the following year. During 1932 the feed was 1.61 tons of roughage and 16 pounds of concentrates per head. The reasons for the unusually large feeding of roughage during 1932 were: (1) the cattle went into the winter in thin condition largely because of short range, (2) very little winter grass was available, (3) approximately 50 percent of the roughage was very poor Russian-thistle hay harvested in 1931, and (4) concentrates were rather lightly fed - only 16 pounds per head.

This ranchman makes a practice of culling his breeding herd each year at branding time. The heifers are culled as yearlings: heifers selected for replacement in the breeding herd are run in a separate pasture away from the cows, while the cull heifers are spayed and run with the breeding herd. The cull cows are separated from the breeding herd and run with the replacement heifers during the breeding season and are shipped the following year as dry fat cows. The replacement heifers are bred the year after culling to calve as 3-year-olds. Breeding pastures are used and the calf crops are above the average. The calf crop raised in 1931 was 76 percent and in 1932, 82 percent.

There is a relatively large amount of land suitable for growing grain or cultivated crops on this ranch. Located on the high uplands, this land is not well suited to alfalfa and dependence is placed mainly on grain hay and corn fodder for roughage. During favorable seasons part of the grain is threshed; during unfavorable seasons or when grain prices are low the entire crop is cut for hay. During 1931 a total of 410 acres of grain and 50 acres of corn fodder were raised and, in 1932, 425 acres of grain and 100 acres of corn were raised. Only 40 acres of grain were threshed during the 2-year-period, the remainder being cut for hay and fodder. The yield of both grain and roughage could be increased by the adoption of a cropping system in which sweetclover has a place and a larger acreage is planted to corn each year.

Total cash receipts for 1931 were $4,713. This entire amount came from the sales of range cattle. There was an increase in numbers and value of cattle on hand at the end of the year amounting to $5,921 and an increase in the value of other livestock of $120 and an increase in the value of crops and feed on hand of $2,541.

This added to the cash receipts makes total ranch receipts of		$13,295
Deducting from the above the cost of livestock bought amounting to	$2,645	
and cash operating expense of	4,544	
and decrease in the value of livestock other than cattle of	15	
and the estimated depreciation on machinery and improvements of	805	
makes total ranch expenses of		$ 8,009
Deducting this amount from the total ranch receipts of $13,295 leaves a balance on the profit side of		$ 5,286
Deducting the estimated operator's labor of		480
leaves a total return on investment for the year 1931 of		$ 4,806

After taking into account the decrease in market values of the cattle on hand at the end of the year this ranch still showed a profit of $1,447. Using the same calculations for 1932 the ranch sustained a loss of $3,914.

RANCH MANAGEMENT

Range Utilization

One of the principal problems facing the ranchmen in this area is that of acquiring control of range that is adequate and is suitably located to provide ranch units of sufficient size for economical operation. This is often difficult and in some instances impossible without paying higher prices than is warranted by average livestock prices.

The few ranchmen (of Class B ranches) who have overcome the problem by leasing additional grazing land on the Fort Berthold Indian Reservation, then leased 76 percent of their grazing land from the Indians. These leases on the Indian reservation were obtained for 13 cents an acre until 1933 when the price was reduced to 10 cents.

Ranchmen generally recognize that economical beef production is largely dependent on an adequate and cheap supply of grass. Range control is necessary to insure a dependable grass supply from year to year, so that less supplementary winter feed will be needed. Proper range utilization is almost as important as an adequate acreage. Proper utilization implies a rate of stocking that will insure against over grazing. Over grazing not only reduces the available forage by checking the growth of plants but also kills certain valuable species of forage plants, which in many cases are replaced by worthless species; this further

reduces the carrying capacity of the range. Proper utilization also suggests the division of the range into summer and winter pastures wherever possible. A considerable saving in hay and other winter feed can be made when cattle can be turned on fresh pasture when winter sets in. Experiments carried on at the United States Range Livestock Experiment Station, Miles City, Montana, indicate that by using range reserved for winter grazing, the expense of wintering is reduced. Needless to say, winter pastures should be located where natural shelter is available.

Crop Production

A problem of great importance to most ranches in western North Dakota is the production of adequate winter feed. In an average year, calves and yearlings, 2-year-old heifers, some cows, and occasionally older steers must be supplied with hay and grain. In an open winter with little snow the older cattle graze out all winter. In a winter with heavy and continuous snow, as in 1932-33, all classes of cattle must be fed a considerable part of the time. Feed production is variable in this area. The year 1931 was a poor crop year. The production from good hay meadows was low and much crop land produced nothing. The year 1932, on the other hand, was a good year and most land suitable for growing grain or cultivated crops as well as meadows had good yields (tables 9 and 12). When a hard winter has been preceded by a good crop year (as the winter of 1932-33) the cattle do not suffer from lack of feed but when a hard winter has been preceded by a poor crop year (as the winter of 1919-20) the losses are great. A year's supply of feed in reserve is the best insurance for such times and prevents considerable worry in other years. Few ranchers included in this study went into the summer of 1932 with much feed left over. (See page 13). Only 7 of the 35 ranches had spent as much as $2 per head for feed in the preceding winter. Only one ranch spent $2 or more per head for feed in the winter of 1932-33. If 1932 had also been a poor crop year the losses in the hard winter of 1932-33 would have been very heavy. Only on the Class A ranches is enough land suitable for growing grain or cultivated crops ordinarily left for the production of cash crops after feed requirements have been met.

Feed Production on Class A Ranches

Few if any good hay meadows are available on Class A ranches. The acreage of crop land is rather large but since much of the available crop land is not of high quality all crop production is more hazardous than on the better grades of land, and better farming methods are required to produce satisfactory yields of both hay and grain crops.

Native hay is an important feed in most range areas; a good hay meadow that will produce every year is the most economical source of roughage. In this area there are few creek or river flats that produce wild hay every year. In 1932 about two-thirds of the ranches in this section cut some wild hay; the average yield was less than one ton. In 1931 only a few ranches cut any wild hay. (See tables 4 to 12 for data on crops).

Tame hay or other roughage must be produced on ranches that have no dependable wild-hay meadows. It is generally conceded that perennial hay crops produced on suitable land furnish more economical winter feed than do annual hay crops which require annual preparation of the land and seeding.

. In the production of feed crops alfalfa should have first place wherever it can be grown successfully. Satisfactory yields are raised on river and creek flats having a deep soil free from hardpan. Outside of such favored areas alfalfa has not proved a profitable crop. A number of ranchmen who were then depending upon wild and grain hay have creek or river flats suitable for the production of alfalfa. Even a small acreage of alfalfa would be a great help in dry years in carrying calves and thin cows through the winter.

Crested wheatgrass is another important hay crop. This grass, relatively new in the northwest, is rapidly gaining favor among stockmen and farmers. It has a much wider range of adaptability than alfalfa, and satisfactory yields have been produced on the high lands where alfalfa has failed. It resembles the native wheatgrasses but starts earlier in the spring and does not winter kill as rapidly. 3/ The average yields of crested wheatgrass hay at the Dickinson and Mandan Experiment Stations have been somewhat higher than the yields of either bromegrass or slender wheatgrass. Crested wheatgrass does not become sod-bound and, everything considered, is a better grass for both hay and pasture than is either bromegrass or slender wheatgrass. Ranchmen who have made a practice of growing grain hay may find it profitable to devote a part of their acreage to crested wheatgrass as a cheaper source of winter feed than grain hay or millet.

Several ranchmen seeded this grass for the first time in 1933 and a few enthusiasts planned to seed their entire cultivated acreage in 1934. It would seem that ranchmen should continue the production of annual hay and forage crops while trying out the new grass until the place of crested wheatgrass has been definitely established.

Sweetclover is common in this area. Nearly one-half the ranches cut some sweetclover hay in 1932, the average yield being a little more than one ton. In 1931, a dry year, a much smaller number of ranches reported sweetclover hay cut and the yield was much smaller. It seems a desirable practice to seed sweetclover with small grain on summer fallow or corn land every year since the additional cost is very small at average prices of seed.

Grain hay is a roughage that is grown to some extent each year on the ranches reporting. The average yield in 1932 was a little more than one ton and in 1931 about three-fourths of a ton. Much of the acreage seeded was not cut in that year. The principal crops used are oats, wheat, rye, and barley, in the order named. Grain hay is important as a roughage in this part of the range area because no other tame-hay crop is generally grown on the crop land. If crested wheatgrass proves dependable it will replace much of the grain hay. On many ranches the value of the grain hay is reduced because it is allowed to ripen before being cut. Ripened straw is of little value. The best time to cut grain for hay is when the grain is in the milk or soft-dough stage, while the straw is still green.

Millet is used to some extent in this area especially as an emergency hay crop when it is apparent that the grain crops will be a near failure. The

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3/ See U. S. Department of Agriculture Technical Bul. 307. Crested Wheatgrass as compared with Bromegrass, Slender Wheatgrass, and Other Hay and Pasture Crops for the Northern Great Plains.

best variety for this use is Siberian millet. Millet can be seeded later than any other feed crop and to make good hay should be harvested before fully headed out. It should be fed with other hay to secure the best results.

About one-half the Class A ranches grew some corn for fodder in 1931 and 1932. Corn fits well in crop rotation and prepares the land for succeeding crops. The estimated average yield of fodder in the dry year of 1931 was about three-fourths of a ton whereas in 1932 it was over a ton, some large fields making as much as 2 tons per acre. Falconer and an early strain of Northwestern dent are the most suitable varieties for this area. A few ranches make a practice of grazing this corn every fall either to fatten cattle that are to be shipped or to put cows and calves in good condition for wintering. This seems a desirable practice and can be used by ranchmen much more widely in this part of range area. It saves labor of cutting, hauling, and feeding the fodder during the winter and gives the same or better results. Lack of fencing seems to have kept many ranchmen from grazing corn. Several have tried putting corn in trench silos for winter feed but this has not proved economical because of the expense involved, except where a dairy herd is kept or some cattle fattening is done.

Cash Crops on Class A Ranches

Class A ranches have a large acreage of crop land relative to the amount of grazing. On ranches having more crop land than required for the production of winter feed it may be profitable to produce some grain crops for sale or for fattening cattle for market. Corn also may be grown for fattening cattle. In 1932 practically all the ranches in this class grew some cash crops. In 1931 cash crops were almost a complete failure although probably as large an acreage as usual was planted. In 1926 to 1928 cash crops made up 19 percent of the income on ranches of this type. In 1931 and 1932, receipts from cash crops were less than 8 percent of the cash receipts. More grain was fed in 1931 and 1932 when feed prices were low. In order of their importance the cash crops are wheat, oats, barley, rye, and speltz. Flax was grown on a few ranches. Cash crops will undoubtedly continue to be an important part of the ranch business in this area especially if prices improve.

Production of winter feed for livestock is more important to the range-cattle producers than production of cash crops for, although cash crops are of considerable importance as a supplementary enterprise on ranches having suitable land, the growing of feed crops is necessary to the success of the major enterprise - range-cattle production.

The growing of feed and cash crops is more important on Class A ranches than on ranches in other classes. These crops are necessary to assure a good winter feed supply and may also be a source of additional income. A number of ranchmen who are so situated that they must depend to a considerable extent on farm-grown crops for their feed supply are not successful because of lack of interest in this direction. Their main interest has been in cattle with as little farming as possible. The success of cattlemen so situated will depend largely on the extent to which interest and ability in the production of feed and cash crops can be developed.

Cropping System for Class A Ranches

A cropping system for these ranches should be so organized as to insure the following:

(1) The production of an adequate supply of supplementary feed for the number of cattle that are necessary to utilize the natural grazing land of the ranch, by growing cultivated feed crops.

(2) The use of the remaining crop land for the production of cash crops. In choosing these crops consideration should be given to their (a) adaptability to the climatic and soil conditions of the region, (b) salability of the crop, and (c) the possibility of using for feed any crop which fails to mature in a dry year.

(3) Such farm practices as will conserve soil moisture, eradicate weeds, and maintain soil fertility.

In the production of either cash crops or annual feed crops a systematic and well-planned cropping system will reduce the hazards of production and will increase the yields. The simplest form of crop sequence that will accomplish the objects stated is alternate cropping and fallow. Under this system one-half the land is summer fallowed and one-half is cropped each year.

A better system, that will increase the net return from the land as well as the return from labor expended, is one in which corn is substituted for fallow. A still more profitable system from the standpoint of permanency, particularly for the man engaged in the livestock industry, is one in which a leguminous hay crop has a place in addition to the grain crop and fodder.

A rotation suitable for ranches that have a surplus of land suitable for growing grain or cultivated crops, above the acreage required to raise an ample feed supply for the cattle that can be run on the available grazing land, where this surplus crop land is to be used for raising cash crops, is given below. Assuming a ranch with enough grazing land to carry 150 cows, which sells yearlings, the number of cattle wintered will be about 150 cows, 2 years old and over; 5 bulls; and 120 calves (or short yearlings). The feed requirement for these cattle would be about as shown in table 36.

Table 36. - Feed required for wintering a herd of designated size in western North Dakota

Class of cattle	Roughage			Quantity of oats required	
	Kind	Quantity			
		Per head	Total	Per head	Total
		Tons	Tons	Bushels	Bushels
150 cows	(hay	$\frac{3}{4}$	$112\frac{1}{2}$	2	300 (for
	(straw	1	150	-	thin cows)
5 bulls	hay	3	15	30	150
120 calves	hay	$\frac{1}{2}$	60	10	1,200
Total	(hay	-	$187\frac{1}{2}$	-	1,650
	(straw	-	150		

Assuming that 450 acres of land suitable for growing grain or cultivated crops is available, and using the remainder of the crop land for cash crops, after deducting the acreage required to raise ample feed, and assuming no supply of wild hay or alfalfa (except a small quantity of wild hay for horses), the rotation to supply the quantity of feed shown in table 37 is about as follows:

Field 1. - 150 acres
75 corn and 75 summer fallow

Field 2. - 150 acres
All wheat, sweetclover seeded with wheat on 75 acres

Field 3. - 150 acres
75 acres of oats and 75 sweetclover

Table 37. - Estimated yield per acre and total production of crops for a cropping system suitable for Class A ranches in Western North Dakota

Crop	Grain				Roughage			
	Acreage	Yield per acre	Total production	Feed produced	Kind	Yield per acre	Total production	Feed produced
	Acres	Bushels	Bushels	Bushels		Tons	Tons	Tons
Corn	75	-	-	-	fodder	1½	112½	112½
Wheat	150	15	2,250	-	straw	¾	112½	112½
Oats	75	25	1,875	1,875	straw	¾	56¼	56¼
Sweetclover	75	-	-	-	hay	1	75	75

In case of a failure of the sweetclover crop, 75 acres can be seeded to oats or millet for hay on field 3. The estimated yields are given in table 37. This is a practical plan for the average ranch in this situation. The feed supply is ample for the number of cattle wintered and the wheat is an additional source of income. It is not expected that any ranchman will feed the exact quantities listed above nor that the estimated yields will always be attained. Yields will vary from year to year in the future as in the past but the yields indicated are conservative estimated of the average that may be expected with the cropping system outlined. Many ranches will undoubtedly exceed the estimated yields and with proper range management will also reduce the feed requirement per head below those given.

The corn acreage listed above is more than is usually raised on the ranches. If corn is not needed for feed, the land can be summer fallowed without affecting the rotation. Corn takes more labor than do the other crops but produces more feed per acre and when the land is fenced can be grazed off instead of being cut.

Feed Production and Cropping System for Class C Ranches

On the ranches located in the Bad Lands (Class C) the production of feed is of great importance as the ranches are short on hay or other crop land in relation to the extent of grazing land available. The production of alfalfa on river flats should receive first consideration since this is the cheapest winter feed on the Class C ranches. Small irregularly shaped fields that are difficult or expensive to farm should be seeded to alfalfa or if such fields are not located in bottom land crested wheatgrass may be substituted. One ranchman from whom information was obtained for 5 years - 1926 to 1928, 1931, and 1932 - grows alfalfa on bottom lands of the Little Missouri River. His acreage and production of alfalfa and other hay crops for each of the years are shown in table 38.

This man had 160 acres of upland wild hay. Only the best was cut. The yield was from 1/3 to 2/3 of a ton per acre. Grain hay was almost a failure in 1931 but the alfalfa on the bottom land yielded from 1 ton to 2 tons for 3 of the 5 years and in 1926 and 1931 (both dry years) it yielded over 1/2 a ton per acre. Also 70 of the 120 acres, in 1931, had been seeded only 1 or 2 years. Where the land suitable for growing grain or cultivated crops is located on the high plateaus, ranchmen may find it profitable to seed crested wheatgrass on a part of the acreage formerly devoted to grain hay. A majority of the ranchmen will undoubtedly continue to grow some grain hay and corn fodder as well as oats for grain.

Table 38. - Acreage and production of hay crops on a selected ranch in western North Dakota, 1926 to 1932

Year	Alfalfa		Grain hay		Native hay		Wild oats	
	Acres	Tons	Acres	Tons	Acres	Tons	Acres	Tons
1926	30	25	50	285	-	-	-	-
1927	25	50	20	20	32	20	-	-
1928	50	80	-	-	75	31	40	40
1931	120	70	38	5	30	15	-	-
1932	120	140	20	20	45	18	-	-

A rotation suitable for ranches on which an adequate feed supply is to be provided but on which no cash crops are to be raised is as follows:

Field 1. - Corn
2. - Oats or wheat and sweetclover seeded
3. - Sweetclover, grain hay or millet
4. - Summer fallow
5. - Grain hay

During the second year field 1 will be seeded to oats and sweetclover on disked land. Field 2 will be in sweetclover from the seeding of the previous year.

If the sweetclover fails, the land can be spring plowed and seeded to oats or millet for hay. Field 3 will be summer fallowed, that is, plowed or duckfooted early and kept free from weeds during the remainder of the season. Field 4 will be seeded to grain hay. Field 5 will be spring plowed and planted to corn. Estimated yields that may be expected under the suggested cropping system are:

Corn fodder $1\frac{1}{2}$ tons	Oats 25 bushels
Sweetclover hay 1 ton	Oats or millet hay 1 ton
Oats straw $\frac{1}{2}$ ton	

200 acres of land rotated as above would give a production of 200 tons of roughage and 1,500 bushels of grain.

Ages and Classes of Cattle

On Class A ranches, where the grazing is limited and an ample supply of feed can be grown, the aim should be to market cattle at younger ages than where grazing is abundant and feed limited. Steers that are 3 and 4 years old must be fat to command the best prices, as the feeder demand for this class of cattle is small and packer-buyers will not bid actively unless such cattle are fat. On these ranches with limited grazing, big steers as ordinarily handled will not become fat anough to attract killer-buyers but the younger cattle do not need to be fat enough for slaughter to command good prices because there is an active demand for these cattle from feeder buyers.

A method of determining which age of cattle is most profitable is to deduct the value of the winter feed from the value of the cattle sold and attribute the difference to the grazing land, since labor other than that used in producing crops, as well as management and investment, would not be greatly different on an acre basis. The feed required per head of cattle wintered is given in table 39.

Table 39. - Recommended quantity of feed per head of cattle wintered on ranches in western North Dakota

Class of cattle wintered	Roughage				Oats
	Straw	Wild or grain hay, or corn fodder	Alfalfa or sweetclover	Total	
	Tons	Tons	Tons	Tons	Bushels
Cows, 2 years and over	1	3/8	3/8	$1\frac{3}{4}$	2
Calves	-	1/4	1/4	1/2	10
Yearlings	-	3/8	3/8	3/4	2
Steers and heifers, 2 years	1/2	1/8	1/8	3/4	1
Bulls	-	1	1	2	30

If straw is valued at $1 a ton, hay and fodder at $5, and oats at 30 cents a bushel, the cost of winter feed for a cow is $5.35, a calf $5.50, a yearling $4.35, a 2-year old $2.05, and a bull $19. The 2-year-old cattle use less than half as much winter feed per head as do younger cattle.

Now let us assume a herd of 100 breeding cows and compute the value that may be attributed to the grazing land by the method mentioned above. The results are given in table 40. The value remaining for grazing land is considerably greater where calves and yearlings are sold than where older cattle are sold. It will be observed that the investment in cattle per acre of grazing land is not greatly different.

Table 40. - Estimated acreage of grazing land required, investment in cattle, value of cattle sold and feed fed, where different age classes of cattle are sold, computed on the basis of a breeding herd of 100 cows, western North Dakota 1/

Age class of cattle sold 2/	Head wintered per 100 cows	Grazing land required - Per ranch	Grazing land required - Per head grazed	Investment in cattle - Per ranch	Investment in cattle - Per acre of grazing land	Value of - Cattle sold - Per ranch	Value of - Feed fed - Per ranch	Value of - Feed fed - Per head wintered	Sales of cattle less value of feed fed - Total per ranch	Sales of cattle less value of feed fed - Per acre of grazing land
	Number	Acres	Acres	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.
Calves	127	1,745	14.2	3,740	2.14	1,631	700	5.51	931	0.53
Yearlings	186	2,305	12.9	4,972	2.16	2,341	1,027	5.52	1,314	.57
2-year-old steers and heifers	242	3,115	13.3	6,502	2.09	2,363	1,270	5.25	1,093	.35
3-year-old grass-fat steers and spayed heifers	296	4,155	14.5	8,672	2.09	3,134	1,394	4.72	1,740	.42

1/ Money values approximately those of 1932. Rates apply to conditions of ranches of Class A.

2/ In each plan it was assumed that the usual number of old cows could be sold each year but otherwise no other cattle than those specified in the age classes.

The problem of determining what age of cattle is the most profitable to handle on Class A ranches may be approached from another angle. Let us assume a ranch consisting of 10 sections of grazing land and one section of crop land. This is about the area that the typical Class A ranch operates. The number of cattle that can be grazed on 10 sections of land when different ages of cattle are sold is given in table 41; the number of cattle sold is also given. The value of cattle sold is shown in table 42; the prices used are about the prices obtained in 1932. Results from the cattle sales of the ranches selling younger cattle are from $100 to $1,400 more than of those selling older cattle.

Table 41. - Estimated number of cattle that 10 sections of grazing land and one section of crop land will carry when different age classes of cattle are sold, western North Dakota 1/

CALVES SOLD

Class of cattle	Cattle (age as of the spring when turned on grass) - Grazed	Weaned	Sold 2/	Wintered	Died	Inventory the following spring	New inventory - all cattle advanced one year in age
	Number	Number	Number	Number	Number	Number	Number
Cows, 2 years and over	365		62	303	9	294	365
Heifers, yearling 3/	73			73	2	71	73
Calves		292	215	77	4	73	
Bulls	12			12		12	12
Total	450	292	277	465	15	450	450

YEARLINGS SOLD

Cows, 2 years and over	275		45	230	8	222	275
Heifers, yearling 3/	55			55	2	53	55
Calves		220		220	11	209	
Bulls	9			9		9	9
Heifers, yearling 4/	49		49				49
Steers, yearling 4/	105		105				105
Total	493	220	199	514	21	493	493

2-YEAR-OLD STEERS AND HEIFERS SOLD

Cows, 2 years and over	205		34	171	6	165	205
Heifers, yearling 3/	41			41	1	40	41
Calves		164		164	8	156	
Bulls	7			7		7	7
Heifers, yearling	37			37	1	36	37
Steers, yearling	78			78	2	76	78
Heifers, 2 years old 4/	36		36				36
Steers, 2 years old 4/	76		76				76
Total	480	164	146	498	18	480	480

3-YEAR-OLD GRASS-FAT STEERS AND SPAYED HEIFERS SOLD

Cows, 2 years and over	153		24	129	5	124	153
Heifers, yearling 3/	30			30	1	29	30
Calves		122		122	6	116	
Bulls	5			5		5	5
Heifers, yearling	28			28	1	27	28
Steers, yearling	58			58	2	56	58
Heifers, 2 years old	27			27	1	26	27
Steers, 2 years old	56			56	2	54	56
Heifers, 3 years old 4/	26		26				26
Steers, 3 years old 4/	54		54				54
Total	437	122	104	455	18	437	437

1/ These data apply particularly to Class A ranches, that is, those having a relatively large acreage of crop land in proportion to the grazing land available.

2/ It was assumed that the usual numbers of old cows were sold each year in addition to the specified class of cattle sold.

3/ For replacement.

4/ For sale.

Table 42. - Estimated value of cattle sold from 10 sections of grazing land and one section of crop land where different age classes of cattle are sold, western North Dakota 1/

CALVES SOLD

Class	Cattle sold	Estimated average weight per head	Total weight	Estimated average price per 100 pounds 2/	Total value
	Number	Pounds	Pounds	Dollars	Dollars
Dry cows	31	1,000	31,000	3.50	1,085.00
Canner cows	31	850	26,350	2.00	527.00
Calves	215	400	86,000	5.00	4,300.00
Total	277	-	143,350	-	5,912.00

YEARLINGS SOLD

Dry cows	22	1,000	22,000	3.50	770.00
Canner cows	23	850	19,550	2.00	391.00
Yearling heifers	49	675	33,075	5.00	1,653.75
Yearling steers	105	675	70,875	5.00	3,543.75
Total	199	-	145,500	-	6,358.50

2-YEAR-OLD STEERS AND HEIFERS SOLD

Dry cows	17	1,000	17,000	3.50	595.00
Canner cows	17	850	14,450	2.00	289.00
2-year-old heifers	36	850	30,600	3.50	1,071.00
2-year-old steers	76	900	68,400	4.25	2,907.00
Total	146	-	130,450	-	4,862.00

3-YEAR-OLD GRASS-FAT STEERS AND SPAYED HEIFERS SOLD

Dry cows	12	1,000	12,000	3.50	420.00
Canner cows	12	850	10,200	2.00	204.00
3-year-old spayed heifers	26	1,050	27,300	4.00	1,092.00
3-year-old steers	54	1,125	60,750	5.00	3,037.50
Total	104	-	110,250	-	4,753.50

1/ These data apply particularly to Class A ranches - those having a relatively large acreage of crop land in proportion to the grazing land available.

2/ Prices are approximately those existing at the end of 1932.

The feed requirements for the different groups of cattle are given in table 43, and the value of the feed at prices then current is given in table 44. The ranch that sells young cattle takes somewhat more feed. The cropping system that will supply the quantity of feed required for the cattle and at the same time fully utilize the crop land is given in table 45. The land not needed for feed production is used in raising wheat for sale and the quantity that would ordinarily be available for sale is shown in this table. The feed required by horses and other livestock is not included here as it is a very small item and would be practically the same on the ranch regardless of the plan of operation used. The ranch sales of cattle and wheat at prices then current are shown in table 46. The total sales are considerably larger on the ranches selling calves and yearlings than on the same size of ranch selling 2- or 3-year-old cattle.

Table 43. - Estimated quantity of feed required to winter the cattle that can be grazed on 10 sections of grazing land and one section of crop land when different age classes of cattle are sold, western North Dakota 1/

Class	Cattle wintered	Quantity of feed required for specified class of cattle		
		Straw	Hay and corn fodder	Oats
	Number	Tons	Tons	Bushels
CALVES SOLD				
Cows	303	303	227	606
Yearlings	73	-	55	146
Bulls	12	-	24	360
Calves	77	-	38	770
Total	465	303	344	1,882
YEARLINGS SOLD				
Cows	230	230	172	460
Yearlings	55	-	41	110
Bulls	9	-	18	270
Calves	220	-	110	2,200
Total	514	230	341	3,040
2-YEAR-OLD STEERS AND HEIFERS SOLD				
Cows	171	171	128	342
Yearlings	156	-	117	312
Bulls	7	-	14	210
Calves	164	-	82	1,640
Total	498	171	341	2,504
3-YEAR-OLD GRASS-FAT STEERS AND SPAYED HEIFERS SOLD				
Cows	129	129	97	258
Yearlings	116	-	87	232
Bulls	5	-	10	150
Calves	122	-	61	1,220
2-year-old steers and heifers	83	41	21	83
Total	455	170	276	1,943

1/ These data apply particularly to Class A ranches - those having a relatively large acreage of crop land in proportion to the grazing land available.

Table 44. - Kind, quantity, and estimated value of feed required to winter the cattle that can be grazed on 10 sections of land, where different age classes of cattle are sold, western North Dakota 1/

Age class of cattle sold	Feed for herd						
	Straw		Hay or fodder		Oats		Total value
	Quantity	Value	Quantity	Value	Quantity	Value	
	Tons	Dol.	Tons	Dol.	Bushels	Dol.	Dol.
Calves	303	303	344	1,720	1,882	564.60	2,587.60
Yearlings	230	230	341	1,705	3,040	912.00	2,847.00
2-year-old steers and heifers	171	171	341	1,705	2,504	751.20	2,627.20
3-year-old grass-fat steers and spayed heifers	170	170	276	1,380	1,943	582.90	2,132.90

1/ These figures apply particularly to Class A ranches, and values used are those that existed in 1932.

The next question is what the difference in expense would be. The investment in land is the same. The investment in cattle, although made up of different numbers of each class of cattle, is nearly the same as shown in table 47. The investment in machinery would be practically the same, as 600 acres of crops are raised in each case. Taxes would be about the same. Less labor (perhaps as much as $100) would be required on the ranches handling the older cattle. On the other hand there are more calves to vaccinate on the ranches selling young cattle. There would be other minor differences but it seems probable that the total difference in expense between any two plans of operation would not exceed $200.

For practical purposes the sales from the ranch represent the relative profitableness of managing this ranch in order to sell calves or yearlings, or 2-year-old steers or heifers, or 3-year-old grass-fat cattle. The conclusion is that with a relatively large amount of crop land and limited range (1 section crop land to 10 sections grazing) it is considerably more profitable to sell calves or yearlings than either 2- or 3-year-old cattle and it is more profitable to sell 3-year-old grass-fat cattle than 2-year-old feeder cattle, on the basis of using the prices for cattle that existed in 1932, that is $3\frac{1}{2}$ cents for fat cows, 2 cents for cull cows, 5 cents for calves, yearling heifers, and steers, $3\frac{1}{2}$ cents for 2-year-old heifers, $4\frac{1}{4}$ cents for 2-year-old steers, 4 cents for grass-fat 3-year-old spayed heifers and 5 cents for grass-fat 3-year-old steers. The above price relation between the different ages and classes of cattle will hold during a period of falling cattle prices, that is, over a period when the production cycle is in its upswing as from 1929 to 1934. In such a period feeder calves and yearlings sell for a higher price

Table 45. - Cropping system designed to produce feed to winter the cattle that can be grazed on 10 sections of land, where different age classes of cattle are sold, western North Dakota 1/

Item	Unit	Age class of cattle sold - Calves	Yearlings	2-year-old steers and heifers	3-year-old grass-fat steers and spayed heifers
Cropping system					
Corn	Acres	125	100	100	100
Fallow	do	75	100	100	100
Wheat	do	150	100	125	200
Sweetclover	do	100	100	100	100
Oats					
For grain	do	75	125	100	75
For hay	do	75	75	75	25
Total	do	600	600	600	600
Feed produced					
Corn fodder	Tons	188	150	150	150
Hay					
Sweetclover	do	100	100	100	100
Oat	do	75	75	75	25
Total	do	363	325	325	275
Straw					
Wheat	do	150	100	125	200
Oat	do	75	125	100	75
Total	do	225	225	225	275
Oats	Bushels	1,875	3,125	2,500	1,875
Feed required for cattle					
Hay or fodder	Tons	344	341	341	276
Straw	do	303	230	171	170
Oats	Bushels	1,882	3,040	2,504	1,943
Wheat produced for sale	do	2,250	1,500	1,875	3,000

1/ These figures apply particularly to Class A ranches - those having a relatively large acreage of crop land in proportion to grazing land available.

Table 46. - Estimated sales of cattle and wheat per ranch, where 10 sections of grazing land and one section of crop land are used and where different age classes of cattle are sold, western North Dakota 1/

Age class of cattle sold	Estimated sales per ranch - Cattle	Wheat	Total
	Dollars	Dollars	Dollars
Calves	5,912	1,125	7,037
Yearlings	6,358	750	7,108
2-year-old steers and heifers	4,862	938	5,800
3-year-old grass-fat steers and spayed heifers	4,754	1,500	6,254

1/ Values as shown in this table are based on prevailing prices in 1932. These figures apply particularly to Class A ranches.

per pound than the older ages of feeder cattle (fig. 3). When cattle prices are rising over several years the heavy classes of feeder cattle sell for more per pound than feeder calves and yearlings. The reason is that cattle feeders want light animals when prices are on the decline and heavy animals when prices are on the upgrade because the heavier the initial weight of the animal the more the cattle feeders lose with a decline in price and the more they make with an increase in price. The question naturally arises whether young ages of cattle will be more profitable than older ages on the particular kind of ranch under consideration in a period of rising prices such as occurred from 1924 to 1928. For this purpose we will assume another set of prices for different ages and classes of cattle. The prices per hundredweight that seem to give a fair relation between the light and heavy classes of cattle during a period of rising prices but on a rather low price level are as follows: Fat cows, $4.50; canner cows, $3.00; calves, $5.00; yearling heifers and steers, $5.25; 2-year-old heifers, $5.25; 2-year-old steers, $6.00; 3-year-old spayed heifers, $5.25; 3-year-old grass-fat steers, $6.25. Comparing these with the prices given in table 42, it will be seen that although both sets of prices are relatively low, that in the above set of prices the older cattle are relatively higher than calves whereas in the prices in table 42 the opposite is true. The set of prices in table 42 is adapted to the upswing of the production cycle and the set of prices given above is more representative of the downswing in the production cycle.

When this new set of prices is substituted in tables 42 and 46 it will be found that the total estimated sales per ranch as given in the last column in table 46 will be:

Where calves are sold. $7,610.50
Where yearlings are sold 7,783.00
Where 2-year-old steers and heifers are sold 7,847.00
Where 3-year-old grass-fat steers and heifers are sold 7,576.00

Table 47. - Estimated amount of investment in the number of cattle that 10 sections of grazing land and 1 section of crop land will carry when different age classes of cattle are sold, western North Dakota, 1932 1/

Class	Cattle on hand	Value per head 2/	Total value
	Number	Dollars	Dollars
CALVES SOLD			
Cows	365	30	10,950
Yearling heifers for replacement	73	22	1,606
Bulls	12	100	1,200
Total	450	-	13,756
YEARLINGS SOLD			
Cows	275	30	8,250
Yearling heifers for replacement	55	22	1,210
Bulls	9	100	900
Yearling heifers and steers	154	22	3,388
Total	493	-	13,748
2-YEAR-OLD STEERS AND HEIFERS SOLD			
Cows	205	30	6,150
Yearling heifers for replacement	41	22	902
Bulls	7	100	700
Yearling heifers	37	22	814
Yearling steers	78	22	1,716
2-year-old heifers	36	25	900
2-year-old steers	76	30	2,280
Total	480	-	13,462
3-YEAR-OLD GRASS-FAT STEERS AND SPAYED HEIFERS SOLD			
Cows	153	30	4,590
Yearling heifers for replacement	30	22	660
Bulls	5	100	500
Yearling heifers	28	22	616
Yearling steers	58	22	1,276
2-year-old heifers	27	25	675
2-year-old steers	56	30	1,680
3-year-old heifers	26	35	910
3-year-old steers	54	45	2,430
Total	437	-	13,337

1/ These data apply particularly to class A ranches - those having a relatively large acreage of crop land in proportion to the grazing land available.

2/ Cattle values are approximately those existing at the end of 1932.

COMPARATIVE WEEKLY AVERAGE PRICES OF FEEDER STEER CALVES, LIGHT FEEDER STEERS, AND MEDIUM AND HEAVY FEEDER STEERS SEPTEMBER-DECEMBER AT OMAHA DURING 5 YEARS OF RISING CATTLE PRICES, 1924-28 AND 5 YEARS OF FALLING CATTLE PRICES, 1929-33

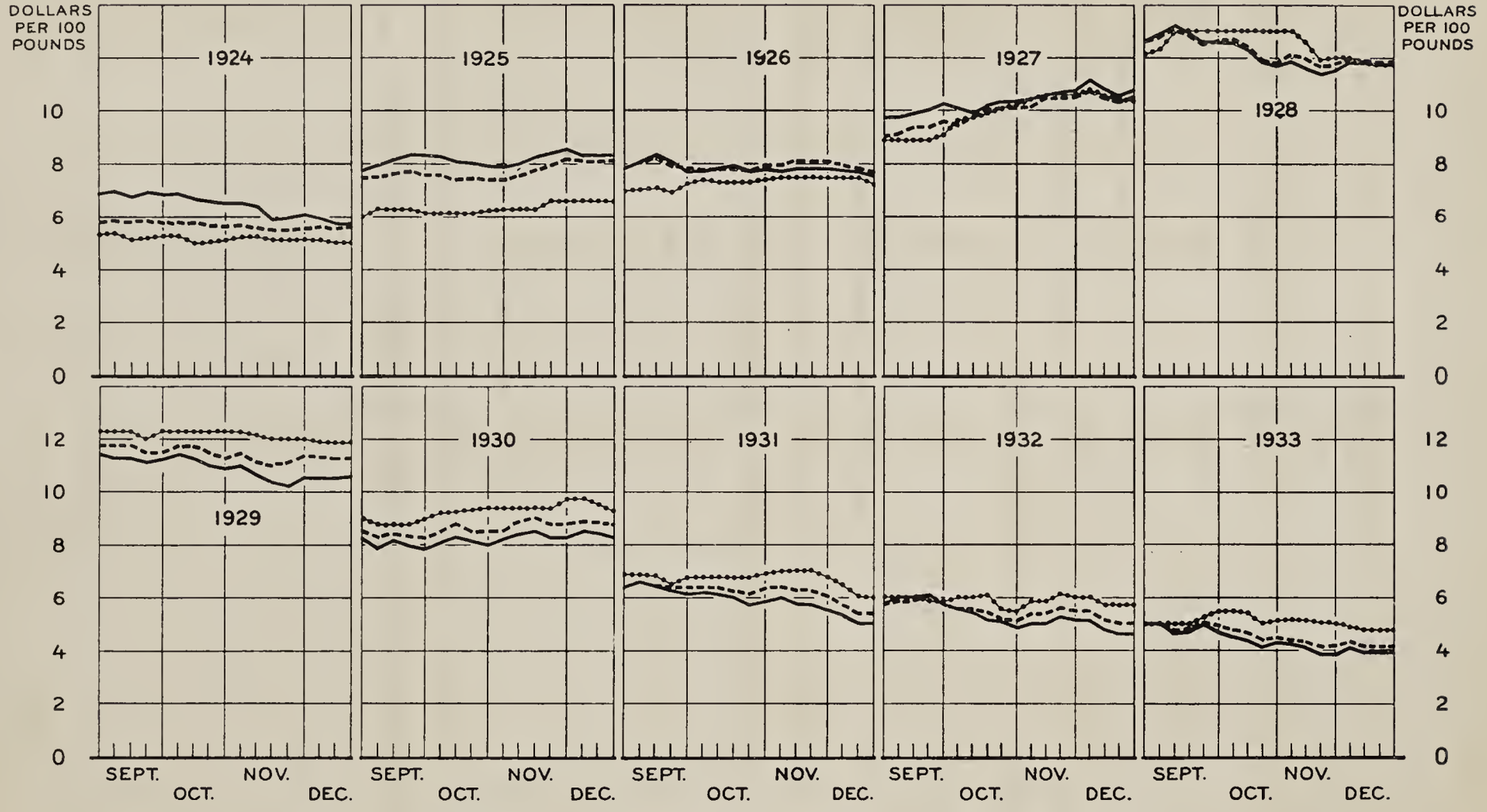

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FIGURE 3.- DURING A PERIOD OF YEARS OF DECLINING CATTLE PRICES, CALVES AND YEARLINGS SELL RELATIVELY HIGHER THAN CATTLE OF OLDER AGES AND THE OPPOSITE IS TRUE DURING SEVERAL YEARS OF RISING CATTLE PRICES.

This shows that there is a small advantage in selling 2-year-old feeder steers and heifers over any of the other classes in a period of rising prices on ranches where the range is limited as compared with the crop land. The difference in favor of older cattle is so small, however, when compared with the difference shown in table 46, that it is doubtful whether it would pay to make this shift in selling policy with the production cycle, especially when it sometimes is difficult to tell the precise position of the production cycle in a particular year. It should be the policy of this class of ranchman to sell calves and yearlings regardless of the production cycle.

From the standpoint of the best utilization of the grazing and crop land on this class of ranches, the handling of as large a number of cows as the available grazing land will support and selling calves or yearlings, is a better practice than handling a smaller breeding herd and selling 3- or 4-year-old cattle. Undoubtedly more beef is produced per acre of land where young cattle are sold than where 3- or 4-year-old cattle are sold, although a larger percentage of the beef will be cow beef where the young cattle are sold (table 48). The value of the beef sold per acre of grazing land is only about three-fourths as much where 2- and 3-year-old cattle are sold as where calves and yearlings are sold.

Table 48. - Estimated quantity and value of beef produced per acre of grazing land, where different age classes of cattle are sold in western North Dakota

Age class of cattle sold	Beef produced per acre of grazing land	
	Quantity	Value 1/
	Pounds	Dollars
Calves	22.4	0.93
Yearlings	22.7	.99
2-year-old steers and heifers	20.4	.76
3-year-old grass-fat steers and apayed heifers	17.2	.74

1/ These data apply particularly to Class A ranches - those having a relatively large acreage of crop land in proportion to grazing land.

Many ranchers in this area are governed from year to year in the marketing of their cattle by the available supplies of feed and range. When feed is plentiful and the range is good, cattle that would otherwise be marketed as calves or yearlings may be held over. When feed supplies are short or the range is poor all the stock cattle including the calves may be sold. In other words many of these ranchmen have no fixed policy with regard to the classes of cattle to be marketed each year. This is a natural result of uncertainty of feed production.

The use of the cropping system outlined previously would insure a more dependable feed supply and greater stability in number and classes of cattle carried. There is little question that stability is an important factor in the financial success of ranches in this section.

The ranchmen in Class B lease large acreages on the Indian reservations and almost invariably sell 3- and 4-year-old steers. Even though their feed supply is large, the ratio of hay and other crop land to the total pasture land including reservation land leased is only 1 to 15. These are generally large outfits. The reservation is usually a considerable distance away from the home ranch and the 2- and 3-year-old steers, spayed heifers, and dry cows are ordinarily wintered on grass on the reservation while thin cows and calves are wintered at home. If the reservation were not available these men would have to reduce the total number of cattle handled and shift to marketing at younger ages.

The ranchmen located in the Bad Lands (Class C ranches) market cattle at all ages from calves to 3- and 4-year-old steers. Generally speaking, the Bad Lands are short on winter feed and long on grazing land but there were several exceptions among the ranches studied. Ranchmen with a large amount of grazing land and limited winter feed should sell the older ages of cattle to utilize fully their grass. Other considerations must be taken into account. If cattle buyers offer a better relative price for yearlings or calves than seems likely to be obtained for older ages, the ranchmen may sell off their young stock even if their grass is not all used.

Range-Cattle Management

The important subject of range-cattle management will be discussed here only to emphasize some of the more important points and to show what the ranchmen on the different types of ranches are doing in this respect. 4/

Herd Improvement

The quality of cattle produced in the range area of western North Dakota is high. Practically all ranchmen use purebred Hereford bulls. But many cow herds lack uniformity and closer culling is necessary to increase the quality of breeding herds. The best time to cull is when heifers are one year old. The heifers to be added to the breeding herd should then be selected and the cull heifers should be sold in the fall as long-age yearlings or they should be spayed.

The cow herd should be culled before breeding time in the spring and the cull cows with calves by their side should be run in a separate pasture during the breeding season. The following year these cows should be shipped as fat cows. Cows that are 9 or 10 years old should always be culled out, as should those of poor conformation, those that raise poor calves, and those that are irregular breeders. Not all fat cows should be culled out, for often the best cows in the herd are dry for a year. Perhaps it will be fair to estimate that 50 percent of the culls will be dry cows and the remainder will be cows with calves by their side. The cull dry cows should be shipped in the fall of that year.

4/ For a more complete discussion see North Dakota Agricultural Experiment Station Bul. 237, pages 38 to 47.

Ranchmen cannot be too careful in the selection of their bulls. The importation of the small fine-boned type of purebred bulls into the range country has tended to reduce the size of cattle and although buyers will probably tell the producers of feeder calves or yearlings that they prefer "lowdown" blocky cattle, the ranchman cannot afford to forget that he must maintain size of his cattle and this can be done most effectively by selecting the right type of bulls. The best type for a ranchman in western North Dakota is an animal of good size, smooth, compact, with large bone and vigorous constitution. Rough leggy bulls should be avoided as should the small fine-boned type, the latter type being largely responsible for the small cattle found on a few ranches.

The average percentage calf crop on Class A ranches was 77.9 in 1931 and 72.6 in 1932; on Class B ranches, 68.4 in 1931 and 59.3 in 1932; and on Class C ranches 71.0 in 1931 and 68.2 in 1932. The average calf crop for all ranches was 73.9 in 1931 and 68.9 in 1932. The term calf crop as used here represents the number of calves raised per 100 cows or heifers bred. Where 2-year-old heifers were segregated from the cows and not bred they were not included. The Class A ranches had a higher average calf crop than either of the other classes. These ranchmen operate on fenced pastures. The Class B ranchmen who operate on the Fort Berthold Indian reservation had the poorest calf crop. The wide variation on different ranches is shown in table 49.

Table 49. - Number of ranches that had specified percentage calf crops, by by different classes of ranches, western North Dakota, 1931 and 1932

Percentage calf crop	Class A ranches		Class B ranches		Class C ranches		All ranches 1/	
	1931	1932	1931	1932	1931	1932	1931	1932
	Number	Number	Number	Number	Number	Number	Number	Number
Under 50	-	--	-	2	-	1	-	3
50 to 54	-	--	-	-	-	1	-	1
55 to 59	1	2	-	-	2	-	3	2
60 to 64	1	2	1	2	3	2	5	6
65 to 69	1	2	2	1	1	-	5	4
70 to 74	4	4	2	-	1	2	7	6
75 to 79	3	2	-	-	2	-	5	2
80 to 84	2	1	-	-	1	3	3	4
85 to 89	3	1	-	-	2	-	5	1
90 and over	2	1	-	-	-	-	2	1
Total	17	15	5	5	12	9	35	30

1/ Includes one ranch not included in any class.

The most important factor affecting the size of the calf crop in this area is the presence or absence of contagious abortion. The disease increased in this area since this study was begun in 1926. It was a serious factor on these ranches. It spreads very rapidly where pastures cannot be fenced to to keep disease-free cattle separate from diseased animals.

The next most important factor is the condition of the breeding herd in the breeding season. Bulls should be conditioned for this season by liberal feeding throughout the late winter and spring. When the breeding season begins in early July, the cows should be on the best pasture available and should be gaining in flesh. The use of breeding pastures is also important. The pastures should be relatively small so the bulls will not be separated from the cow herd for more than a day at a time, and relatively level topography is preferable to rough or broken land, as the cattle are not so likely to become separated. The number of cows per bull is not so important as the condition of the bulls. Large calf crops have been produced on ranches in this area where twice the customary number of cows per bull were handled, but in all such cases the breeding herd and particularly the bulls were in good condition during the breeding season and breeding pastures were used. Probably less than one-third of these ranches condition their bulls and only 5 or 6 of the 30 ranches use breeding pastures.

Ranchmen on Class A ranches which are located outside the Bad Lands proper have the best opportunities to produce good calf crops because of available feed for conditioning their cattle and because of the open country and relatively level topography of their range. Ranchmen in this district operate almost entirely on fenced pastures and a small additional outlay for fencing will provide the breeding pastures.

The men who operate on the Fort Berthold Indian Reservation (Class B ranches) do not ordinarily provide breeding pastures. With an area of over 100,000 acres included in a single pasture, breeding conditions here are the same as under open range conditions. The bulls are usually in good condition when turned out. It is entirely possible to fence off a limited area for the breeding herds and closer riding should be practiced during the breeding and calving season.

Ranchmen on the Bad Lands (Class C ranches) have the same opportunity as the reservation ranchmen to fence off breeding pastures where the topography is reasonably level and a water supply is available. Practically the same considerations apply here as on the Class B ranches except that the Bad Lands ranchmen should give more attention to conditioning their bulls for the breeding season.

Many ranchmen seem to think that a long-breeding season is necessary to produce a good calf crop. This is not the case since it is known that high crops have been produced with a breeding season of 2 months. By using breeding pastures with a breeding herd in good physical condition the breeding season can be shortened to 3 months or less and a calf crop uniform as to age and size will result. This is especially important to the ranchmen on Class C ranches who make a practice of selling calves, since late calves that are too small to go into the feed lot at time of sale are usually cut back and must be sold at a sacrifice or carried through the winter.

There is a greater loss among calves than in any other class of cattle. Most of this loss can be attributed to digestive disorders following weaning. The loss is heaviest among calves too young to wean when winter sets in. Diseases like coccidiosis and calf pneumonia are rather common and account for a large part of the losses. Occasionally blackleg causes considerable loss both among calves and yearlings, in spite of the fact that vaccination against blackleg is the universal practice. The losses from blackleg occurring after vaccination can be attributed to carelessness or to inferior vaccine. Losses from coccidiosis

and similar diseases are largely preventable. Calves should be weaned at approximately 5 months of age and given adequate feed and shelter, especially during stormy weather. Unusual losses sometimes occur from late spring snowstorms such as the one that occurred in May 1927.

Ranchmen recognize the desirability of not breeding heifers until they are 2 years old but lack of fenced pasture keeps most of them from carrying out this practice. About one-third of the ranchmen bred their heifers to calve at 3 years. Wherever possible separate pastures should be provided because many heifers that calve at 2 years of age are lost, and many heifers do not calve the next year after having their first calf at 2 years of age.

Wintering Range Cattle

Wintering is the most expensive as well as the most important factor in the handling of cattle in this area. The total quantity of feed produced from year to year is extremely variable because of climatic conditions, especially on Class A and Class C ranches. The quantity of feed required for wintering depends upon the condition of the range and whether the winter is open enough so that the cattle can "winter out". In the days of the open range no winter feed was provided. Now the general practice is to winter the 2- and 3-year-old steers, spayed heifers, and dry cows on grass only, but even this kind of cattle must be fed if the snow becomes deep or ice covers the grass. If the feed supply is short these cattle are the last to receive feed. Calves, yearlings, 2-year-old heifers, and thin cows have first claim on feed and the best feed ordinarily goes to the calves.

The feed supply produced in 1930 for the winter of 1930-31 was about 75 percent of what could be expected in an average year. In 1931 the feed supply produced per acre was probably not more than 50 percent of average, and in 1932 was about average (table 9). The average yields to be expected for the area as a whole are estimated as follows: Native hay, 1/2 ton 5/; corn fodder, 1½ tons; grain hay, 1 ton; and sweetclover, 1 ton. Only 0.46 ton of roughage per head of cattle to be wintered was raised in 1931, (table 6) and about twice as much or 0.99 ton in 1932 for each head of cattle to be wintered the following winter. As shown in tables 6 and 50, about twice as much feed was used in the winter 1931-32 as was raised the preceding summer.

The quantity of feed fed depends on the weather conditions during the winter, the quantity of feed available, and the condition of the winter ranges. The winter of 1930-31 was fairly open and the condition of the range from December to April was about 75 to 80 percent of normal. The winter of 1931-32 was also open and the condition of the range was about 65 to 70 percent of normal. The winter of 1932-33 was a bad winter largely because of the poor quality of the native grass and the deep snow. Little grazing was available. The condition of the range was about 70 to 80 percent of normal. Only 0.56 ton of roughage was fed per head of all cattle wintered in 1930-31 while 0.94

5/ The yield of native hay varies greatly from year to year and among the ranches. An average yield of 1/2 ton per acre is too high if all land listed as native-hay land is cut every year but is too low for the good bottom meadows found on Class B ranches.

Table 50. - Kind and average quantity of feed fed per 100 head of range cattle wintered, by class of ranch, winters of 1930-31, 1931-32, and 1932-33, western North Dakota

Item	Unit	Class A ranches			Class B ranches			Class C ranches			All ranches 1/		
		1931	1932	1933	1931	1932	1933	1931	1932	1933	1931	1932	1933
Ranches	Number	17	15	15	5	5	5	12	9	9	35	30	30
Roughage													
Tame hay	Tons	15.3	16.5	19.9	6.6	4.7	6.1	10.5	11.4	9.9	12.1	11.5	14.1
Native hay	do	5.9	6.4	15.7	38.8	45.8	67.6	12.9	20.3	11.4	17.7	22.8	31.2
Grain hay	do	11.8	31.1	21.0	5.6	14.8	13.5	10.1	44.7	24.4	8.9	28.0	18.9
Millet	do	-	2.6	4.3	-	1.3	.7	1.3	5.6	1.6	.5	2.7	2.6
Fodder	do	2.7	7.1	4.3	-	.1	-	5.1	5.6	10.1	2.4	4.1	4.1
Wild-oat and other hay	do	7.9	4.9	.9	-	-	-	1.6	5.3	7.3	3.5	3.2	2.1
Total	do	43.6	68.6	66.1	51.0	66.7	87.9	42.0	92.9	64.7	45.1	72.3	73.0
Silage	Tons	7.9	2.9	4.6	-	-	-	-	-	-	3.0	1.1	1.7
Straw and other roughage	do	11.1	24.6	23.0	6.9	8.6	2.1	5.3	32.2	18.8	7.9	20.3	13.9
Total	do	62.6	96.1	93.7	57.9	75.3	90.0	47.3	125.1	83.5	56.0	93.7	88.6
Corn grazed	Acres	5.0	4.0	-	-	-	-	.3	.6	-	2.0	1.9	-
Small grain grazed	do	.4	1.0	-	11.6	-	-	-	-	-	3.6	.4	-

Table 50. - Kind and average quantity of feed fed per 100 head of range cattle wintered, by class of ranch, winters of 1930-31, 1931-32, and 1932-33, western North Dakota - Continued

Item	Unit	Class A ranches			Class B ranches			Class C ranches			All ranches 1/		
		1931	1932	1933	1931	1932	1933	1931	1932	1933	1931	1932	1933
Grain													
Oats	Bushels	121	17	31	69	27	48	96	27	116	93	28	59
Barley	do	150	93	69	20	13	12	90	54	71	87	52	47
Corn	do	8	9	-	-	3	-	-	2	-	3	7	-
Speltz	do	45	15	6	9	1	6	7	-	-	22	6	4
Wheat	do	77	23	1	15	7	10	35	16	39	43	16	13
Rye	do	26	8	12	21	1	-	5	-	4	18	3	6
Flax	do	1	-	-	-	-	-	-	-	3	1	-	1
Other feed													
Bone meal	Pounds	10	-	-	-	-	-	3	5	-	4	1	-
Beet pulp	do	-	97	-	101	-	-	-	-	-	30	37	-
Cottonseed cake	do	900	3,730	1,677	278	3,334	82	432	1,306	328	668	3,236	869
Screenings	do	3,114	3,976	2,836	-	-	-	1,433	311	1,037	1,578	1,583	1,317
Mill feed	do	155	370	-	38	721	-	28	62	-	78	514	-
Ground grain	do	-	78	-	-	-	-	80	-	-	22	30	-
Total concentrates	do	23,631	16,191	9,789	6,021	6,227	3,034	12,028	6,212	11,217	14,224	10,553	7,662

1/ Includes one ranch not included in any of the three classes.

ton was fed in 1931-32. More feed was available in 1930-31 but the winter was open and considerable feed was carried over. Less feed was available in 1931-32 but more feed was needed. Less grain and more cottonseed cake was fed in 1931-32.

More feed should be raised and fed on ranches in this area than was the practice. The recommended quantities of feed per head to provide for each class of cattle are given in table 39. They are larger than ordinarily fed and allow for the accumulation of a reserve supply. A reserve supply of feed is very important in this area where crop production is uncertain, especially on Class A and Class C ranches which have to practice farming to raise most of their feed. In dry seasons if feed must be bought it is usually high-priced and reduces the profits of the business. Cottonseed cake is usually the most economical concentrate to buy.

To avoid the customary digestive disturbances at weaning time calves should be given the best feed available on the ranch. This usually consists of the best prairie hay and whole oats. In addition, shelter should be provided and an adequate supply of fresh water should be available at all times.

Numbers of Cattle Handled

The numbers of cattle handled by ranchmen in this area are seldom stationary but fluctuate from year to year. Among the most common reasons for the fluctuations are available range and winter feed supplies and prevailing prices at marketing time.

During the 2-year period from January 1, 1931 to January 1, 1933, there was an increase in the total numbers of cattle on hand on the 30 ranches for which data were obtained, the increase for the 2-year period amounting to 23 percent as shown below:

Cows	+	31 percent
2-year-old heifers	+	40 "
Yearling heifers	+	19 "
Bulls	+	2 "
Yearling steers	+	17 "
2-year-old steers	+	20 "
Steers, 3-years old and over	+	19 "
Spayed heifers	-	44 "
All cattle	+	23 "

The greatest increase (40 percent) was in 2-year-old heifers; the smallest occurred in bulls which increased only 2 percent during the period. Spayed heifers showed a large decrease.

The principal reason for the increase in cattle can be attributed to the belief that cattle prices had reached the bottom and were due to rise. This opinion prevailed rather generally among stockmen during this period and accounts particularly for the increase that occurred during 1931 which was a dry season when many were forced to buy winter feed.

The relatively small increase in the number of bulls during the period mentioned can be attributed to the fact that the stringent financial situation prevented the purchase of bulls from keeping pace with the increase in breeding cows and heifers. Few ranchmen raise their own bulls. Some ranches apparently did not have enough bulls to insure a normal calf crop.

Range Management

Proper range utilization is vitally important because on this phase of management much of the success of the ranching business depends. During the days of the open range little attention was paid to range management because it was beyond the power of the ranchmen to control or regulate the grazing. During later years more and more of the range land came under the control of the operators and with this came the higher cost of grazing and the necessity for better utilization of the range.

The native grass is the cheapest source of feed in the range country and on its most extensive use depends much of the profit of the range-cattle producers. Supplementary feeds, like hay or grain, are high-cost feeds. A minimum use of such feeds consistent with good management, with an increase in the use of grazing land, will undoubtedly increase the profits of the ranchman.

The first and most important consideration in any system of range management is the prevention of overgrazing. Evidence of overgrazing is seen in the disappearance of some of the most valuable species of grasses, such as the wheatgrasses, and their replacement in many cases by worthless species of weeds. The experienced ranchman knows by the condition of the range and the condition of his cattle when overgrazing takes place, but he should prevent it by using the proper rate of stocking. The proper rate, in the judgment of most ranch operators, is the number of cattle that will be supported during average years without deterioration of the range. This rate is too high during dry seasons; at such times the ranchman has the choice of leasing additional land if it is available or reducing the use of grazing land by the increased use of supplementary winter feed or the reduction of his cattle numbers. (For total land and grazing land used per head of cattle in 1931 see table 51).

Table 51. - Average acreage of land grazed and total land used per ranch and per head, by class of ranch, western North Dakota, 1931

Class of ranch	Ranches	Cattle per ranch	Land grazed - Per ranch	Land grazed - Per head	Total land used - Per ranch	Total land used - Per head
	Number	Number	Acres	Acres	Acres	Acres
A	17	304	6,007	19.8	6,654	21.9
B	5	792	14,393	18.2	15,327	19.4
C	12	302	7,141	23.6	7,655	25.3
All ranches 1/	35	386	7,993	20.7	8,633	22.4

1/ Includes one ranch not included in any class.

The apparent contradiction of table 51 to the statement made in the first part of this report that the grazing land on Class A ranches has a higher carrying capacity than on either of the other groups can be explained by the fact that more free range is used by Class B and Class C ranches than is indicated by the records. The acreage figures given for free range are estimates which are probably too low. In the districts where Class A ranches are located, free range is relatively scarce.

The carrying capacity of the range is determined by the quality as well as the quantity of grass. Range that has a high percentage of sand grass (Calamovilfa longifolia) or little bluestem (Andropogon scoparius) is not nearly so valuable as range composed of western wheatgrass (Agropyron Smithii) and blue grama (Bouteloua gracilis). The first two named are practically worthless from a grazing standpoint since only occasionally will cattle graze them and then only lightly. The worthless species appear to increase when the range is overgrazed; little bluestem particularly is increasing in many parts of the range country.

The division of the range into summer and winter pastures is a good management practice which is being followed on a few ranches. Usually about two-thirds of the range is devoted to summer and one-third to winter pasture. As far as possible the winter pasture should be located in the roughest part of the range, to provide winter protection. It may be necessary to provide a water supply on parts of the range in order to get the best range utilization. This means an additional expense but it may be a profitable investment.

A good winter pasture reduces the winter-feed requirements. Grass is the cheapest feed in the range country. Here and there a ranchman has provided a small pasture near the buildings where thin cows and 2-year-old heifers are kept during the calving season. If this pasture is on tillable land, it should preferably be seeded to crested wheatgrass to provide early spring grazing.

The surplus crop land on the Class A ranches, or land that has been broken up and later abandoned, can be profitably seeded to crested wheatgrass for hay or early spring grazing. This grass makes pasture 2 to 3 weeks earlier than does native grass, but is not suitable for late pasture because of its early maturity and its woodiness after maturity.

Weaning

The ranchmen's experiences indicate that most calf losses can be prevented by proper care and feeding. Calves should be weaned early so they will become accustomed to their feed and water before winter begins. A few ranchmen in other States make a practice of "creep feeding" calves to accustom them to grain feed before weaning. In "creep feeding" the calves are fed grain through a creep which allows the calves access to grain but prevents the cows and older cattle from reaching it. This practice may be followed profitably on many ranches in western North Dakota.

A few ranches in this State turn cows and calves into standing corn for a month or more before weaning time to accustom the calves to eating corn fodder while still with the cows. This practice is beneficial to the cows as well as the calves in that it gives them a chance to gain in flesh in the fall and thus come through the winter better. This practice may be profitably followed on Class A ranches or others having surplus crop land, particularly during favorable crop years.

Ranchmen agree that the best roughage on which to start calves is clean upland prairie hay. Coarse slough hay and alfalfa from irrigated or flooded fields have caused trouble, particularly coccidioses, among calves. No grain is superior to clean whole oats for weaning calves; if they are accustomed to eating it before being weaned so much the better.

The water supply should be clean and easily available at all times and shelter, which need not be expensive, should be provided as a protection against storms and severely cold winds.

Effect of the Depression on Ranch Management

The years 1931 and 1932, in which this study was made, were years of low prices for cattle as well as for other commodities (tables 52 and 53). These low prices were due not only to the depression, usually said to have begun in 1930, but to the increasing numbers of beef cattle in the United States which began in 1928.

Just how have the ranchmen in this area responded to this situation? The first effect was an increase in borrowing; 16 of the 30 ranchmen increased their indebtedness during the 2 years, 5 decreased it, and 9 kept it the same.

Table 52. - Average price per 100 pounds of western range steers at Chicago, for specified months, 1922-35 1/

Year	August	September	October	November	Average (4 months)
	Dollars	Dollars	Dollars	Dollars	Dollars
1922	6.50	7.25	6.85	6.25	6.71
1923	7.35	7.25	6.25	6.15	6.75
1924	6.75	6.60	6.75	6.00	6.52
1925	8.15	8.35	8.50	8.00	8.25
1926	7.05	7.55	7.40	7.25	7.31
1927	10.00	10.25	10.75	11.50	10.63
1928	11.85	12.65	11.35	10.40	11.56
1929	10.35	10.40	10.00	9.85	10.15
1930	7.15	7.75	7.85	7.50	7.56
1931	6.45	6.10	5.30	5.35	5.80
1932	5.75	5.50	5.10	5.60	5.49
1933	4.05	4.15	3.85	3.80	3.96
1934	4.35	4.70	4.35	3.60	4.25
1935	7.45	7.45	7.30	6.80	7.25

1/ As reported by the Daily Drovers Journal.

Table 53. - Average price per 100 pounds of western range steers at Chicago, 1902-1935 1/

Year	Price per 100 pounds	Year	Price per 100 pounds	Year	Price per 100 pounds
	Dollars		Dollars		Dollars
1902	4.94	1914	7.66	1926	7.31
1903	3.62	1915	7.74	1927	10.63
1904	3.66	1916	8.34	1928	11.56
1905	3.80	1917	10.56	1929	10.15
1906	4.41	1918	14.54	1930	7.56
1907	4.60	1919	11.25	1931	5.80
1908	4.81	1920	9.40	1932	5.49
1909	5.30	1921	6.20	1933	3.96
1910	5.39	1922	6.71	1934	4.25
1911	5.66	1923	6.75	1935	7.25
1912	7.54	1924	6.52		
1913	7.42	1925	8.25		

1/ Simple average of the average monthly prices per 100 pounds, for August, September, October, and November, as reported by the Daily Drovers Journal.

Next, the equipment, buildings, and fences depreciated more than normally because repairs and replacements were neglected. Death losses among cattle were greater partly because expense for labor was cut wherever possible. Few new bulls were introduced. Efforts to save expenses all along the line prevented ranchmen from making many adjustments that would involve additional cost even though they might be profitable in the long run.

LAND UTILIZATION AND RANGE CONTROL

This area, in common with many others that are mostly suited for grazing but that contain some land on the borderline between crop land and grazing land, has suffered from an unfortunate land policy. Its resources are not being used to the fullest advantage. Some land is being cropped that should be in grass or should be a part of a ranch unit. Some land is held out of use in part or altogether by the owner's hope that some day he can find a buyer at his price. Some land is overgrazed because the ranchmen cannot obtain the use of other land. Some is undergrazed. The area as a whole is undoubtedly understocked. One ranchman may have too much grazing land and not enough crop land, whereas near him may be a farmer who is trying to eke out a living on a little piece of crop land that ought to be a part of a ranching unit. Others have more hay land than they can use considering the amount of grazing land they can obtain. The fullest use of the grazing and forage-producing resources will not be attained until some form of control of the use of land is possible for this area.

Range Control

In this region, the Federal Government gave the odd-numbered sections for 50 miles on each side of its right of way to the Northern Pacific Railway Company when the road was built. This land has been, and the remainder still is, for sale or lease to anyone who might want it. Sections 16 and 32 of each township were granted to the State for school purposes. The remaining sections, usually 16 in each township, were open to homestead entry and most of them have been homesteaded, often with intent to sell to established stockmen or farmers. Since much of the railroad land has not been sold or leased and some Federal land still remains, the resulting ownership is a sort of checkerboard which renders consolidation into ranch units difficult or almost impossible, table 54 and figures 4 to 7. Much of it is now held by absentee owners. Around the Bad Lands some of the best land came into the hands of farmers and is now used for farming although surrounded by land fit only for grazing.

Thus, there is a large body of uncontrolled and little-used grazing land scattered throughout the Bad Lands and the adjacent territory. Much of this land has reverted to the various counties for nonpayment of taxes during recent years. The counties, at present, are the largest land owners in parts of this area. A small percentage is Government land. The bulk of the land is owned by private individuals, a large majority of whom are non-residents. Most of the land is owned in small tracts usually in units of the same size as those deeded by the Government to the homesteaders, ranging from 160 to 640 acres per unit. In an area that requires from 20 to 30 acres of grazing land per cow, these units are much too small for economical operation in raising cattle. Only by the consolidation of a number of such small units with units of larger size can they be utilized efficiently.

The ranchmen operating in this area bought their holdings from railroad companies and individual owners and more recently they have bought land that reverted to the counties for nonpayment of taxes. By this process a few ranchmen have obtained an adequate supply of land suitably located for economic operation, but most ranchmen have not. One of the principal reasons is that even though one had bought all the tracts of privately owned land in a certain territory, there would probably be several tracts still owned by the Government and until recently open for homestead entry. In the past, some of this Federal land shown in maps could be bought from the Government as "isolated tracts." Much of this land, however, could not be leased or fenced in, even though ranchmen had acquired title to all the other land in that vicinity. Without fencing, the ranchman cannot control his grazing. All are free to run their cattle on this land so that it is overgrazed; moreover, the ranchman cannot make plans ahead involving the use of this grazing as it may not be available when he is ready for it.

In many cases, even though this land may never have returned any income to the owner, it is impossible to buy the privately owned land at prices that a ranchman can afford to pay for grazing purposes. The land can usually be grazed but no control is possible, and usually it cannot be leased for more than a year at a time. A ranchman cannot afford to fence land when a part or all of it may pass out of his control in a year.

Table 54. - Status of ownership of 23 townships in selected areas in western North Dakota, 1929-30

AREA I 1/

County and township	Quarter sections owned by -					
	County	State	Govern-ment	Local owners	Out-of-State residents	Unknown persons
Dunn:	Number	Number	Number	Number	Number	Number
146 N. R. - 96 W	0	8	3/4	101 1/4	34	0
146 N. R. - 97 W	9 1/2	7 3/4	4 1/4	35	87 1/2	0
147 N. R. - 96 W.	8 1/2	7	6 3/4	49	72 3/4	0
147 N. R. - 97 W	14 3/4	8	13 1/4	83	25	0
148 N. R. - 96 W	4	8	39 1/4	76	16 3/4	0
148 N. R. - 97 W	4 1/2	8	61 1/2	51	18 1/2	0
Total	41 1/4	46 3/4	125 3/4	395 1/4	254 1/2	0
Percent	5.0	5.0	15.0	46.0	29.0	0.0

AREA II 1/

Golden Valley:						
143 N. R. - 103 W	45 3/4	8	7 1/4	23	60	0
143 N. R. - 104 W	10 1/2	10	1 3/4	21 1/2	100 1/4	0
Billings:						
2/144 N. R. - 101 W	54	8	24 1/2	23 1/2	34	6
2/144 N. R. - 102 W	7 1/4	8	17	60 1/4	57 1/2	0
Golden Valley:						
2/144 N. R. - 103 W	29	8	22	33 1/4	57 3/4	0
2/144 N. R. - 104 W	6 1/2	8	6 1/2	63 1/2	63 1/2	2
McKenzie:						
145 N. R. - 100 W	29	8	25 1/4	29	52 3/4	0
145 N. R. - 101 W	0	12	37 3/4	6 1/4	88	0
145 N. R. - 102 W	8	16	32	29 1/2	57 1/2	1
146 N. R. - 100 W	31	8	28	15	62	0
146 N. R. - 101 W	4	8	28	40	64	0
146 N. R. - 102 W	11 1/4	10	26 1/4	23	73 1/2	0
Total	236 1/4	112	256 1/4	367 3/4	770 3/4	9
Percent	13.0	6.0	15.0	21.0	44.0	1.0

AREA III 1/

Slope:						
2/136 N. R. - 102 W	4 1/2	8	6	143 1/3	12	4
2/136 N. R. - 103 W	6	7	3	95	37	0
2/136 N. R. - 104 W	2	8	7 1/2	46	82 1/2	2
Billings:						
137 N. R. - 101 W	11	8	4 1/2	58 1/4	62 1/4	0
Golden Valley:						
137 N. R. - 102 W	6 3/4	8	10 1/4	65	54	0
Total	30 1/4	39	31 1/4	407 3/4	247 3/4	6
Percent	4.0	5.0	4.0	54.0	32.0	1.0
Grand total	307 3/4	197 3/4	413 1/4	1,170 3/4	1,273	15
Percent	9.0	6.0	12.0	35.0	38.0	0.0

1/ Areas I, II, and III correspond with figures 4, 5, and 6, respectively.
2/ Oversize townships.

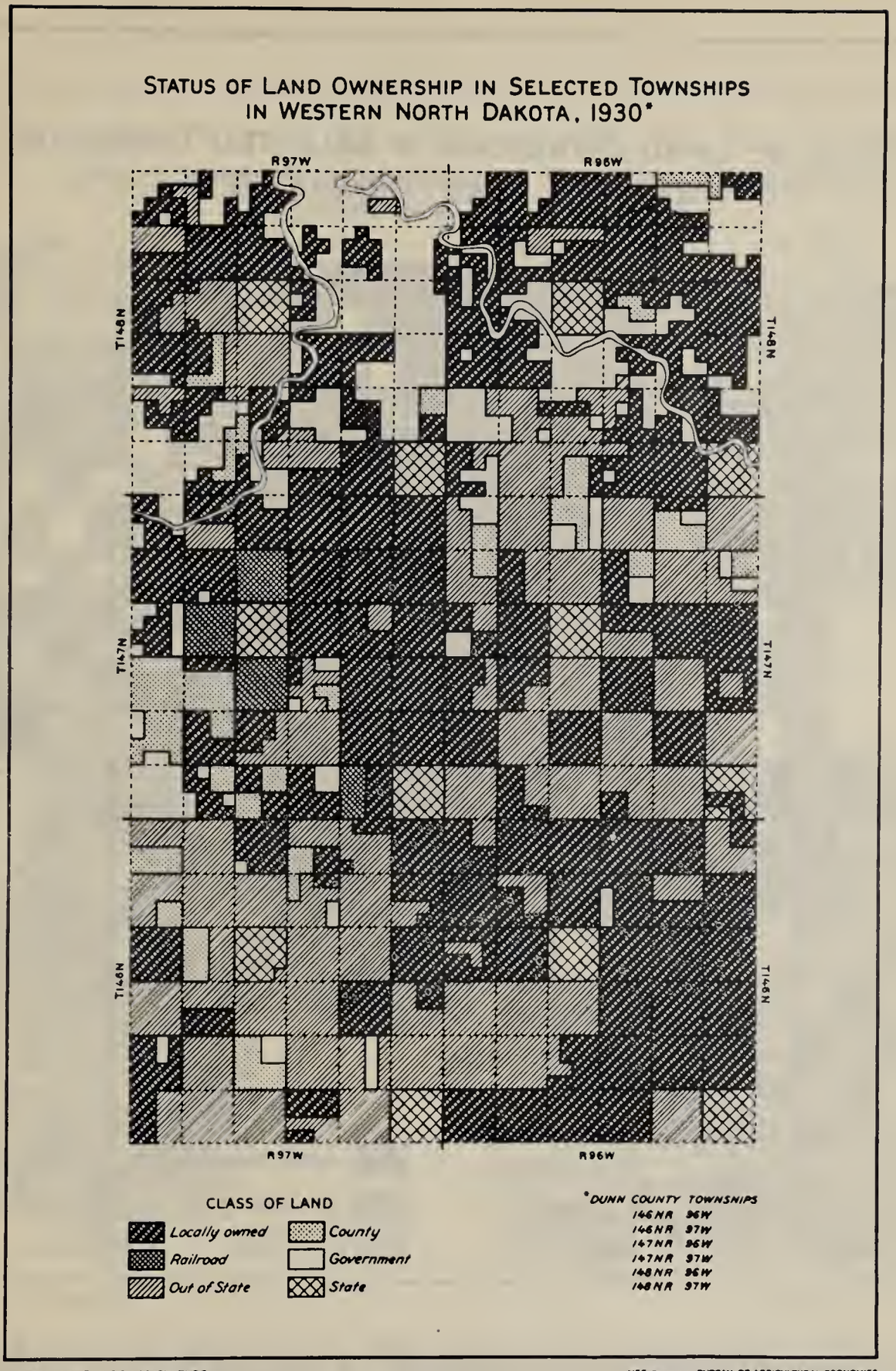

FIGURE 4.- THE TOWNSHIPS SHOWING MUCH LAND LOCALLY OWNED ALSO HAVE CONSIDERABLE CROP LAND.

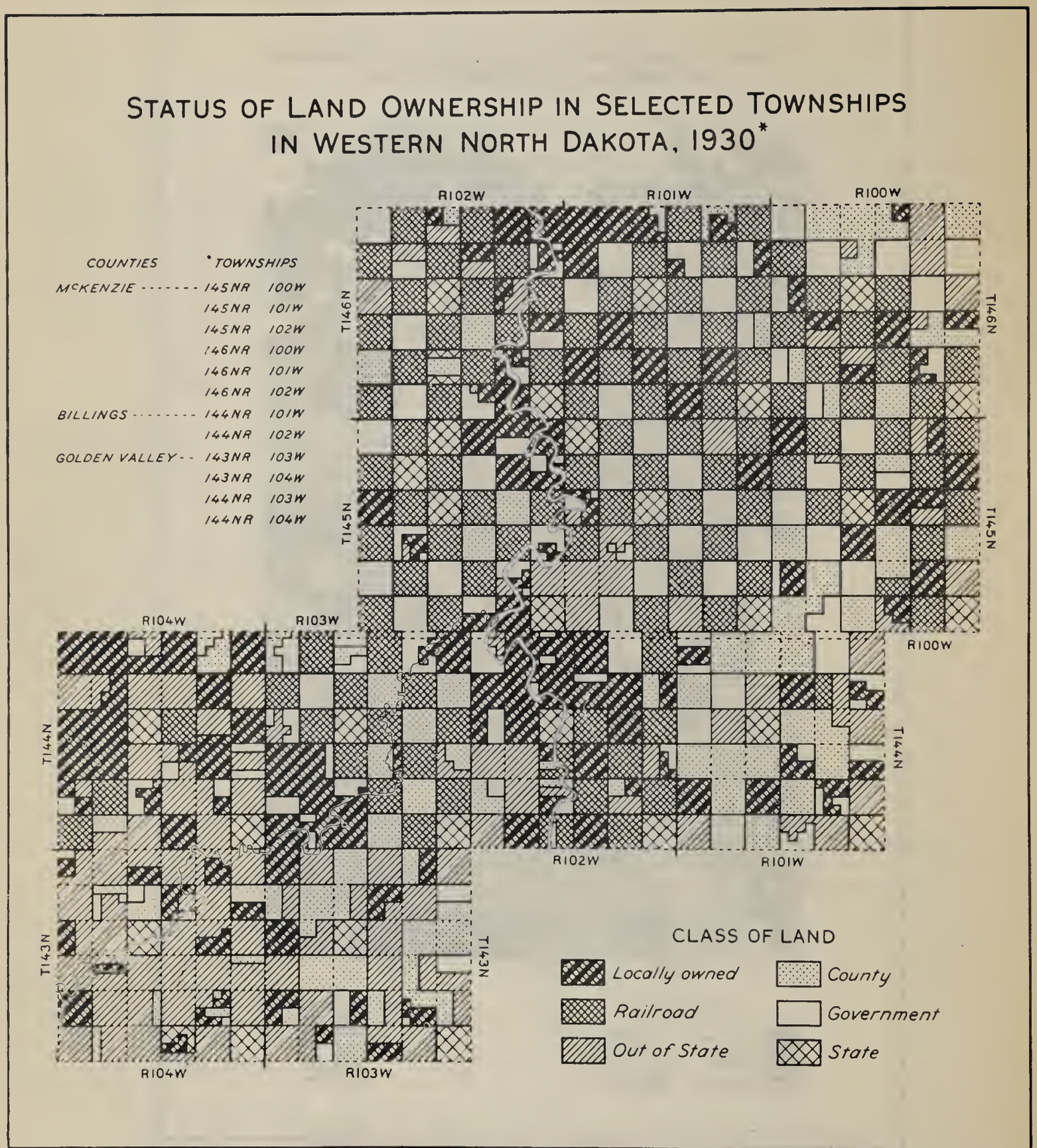

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FIGURE 5.- DIVERSE OWNERSHIP AND SCARCITY OF LOCALLY OWNED LAND CHARACTERIZE THIS AREA, MUCH OF WHICH LIES IN THE BAD LANDS.

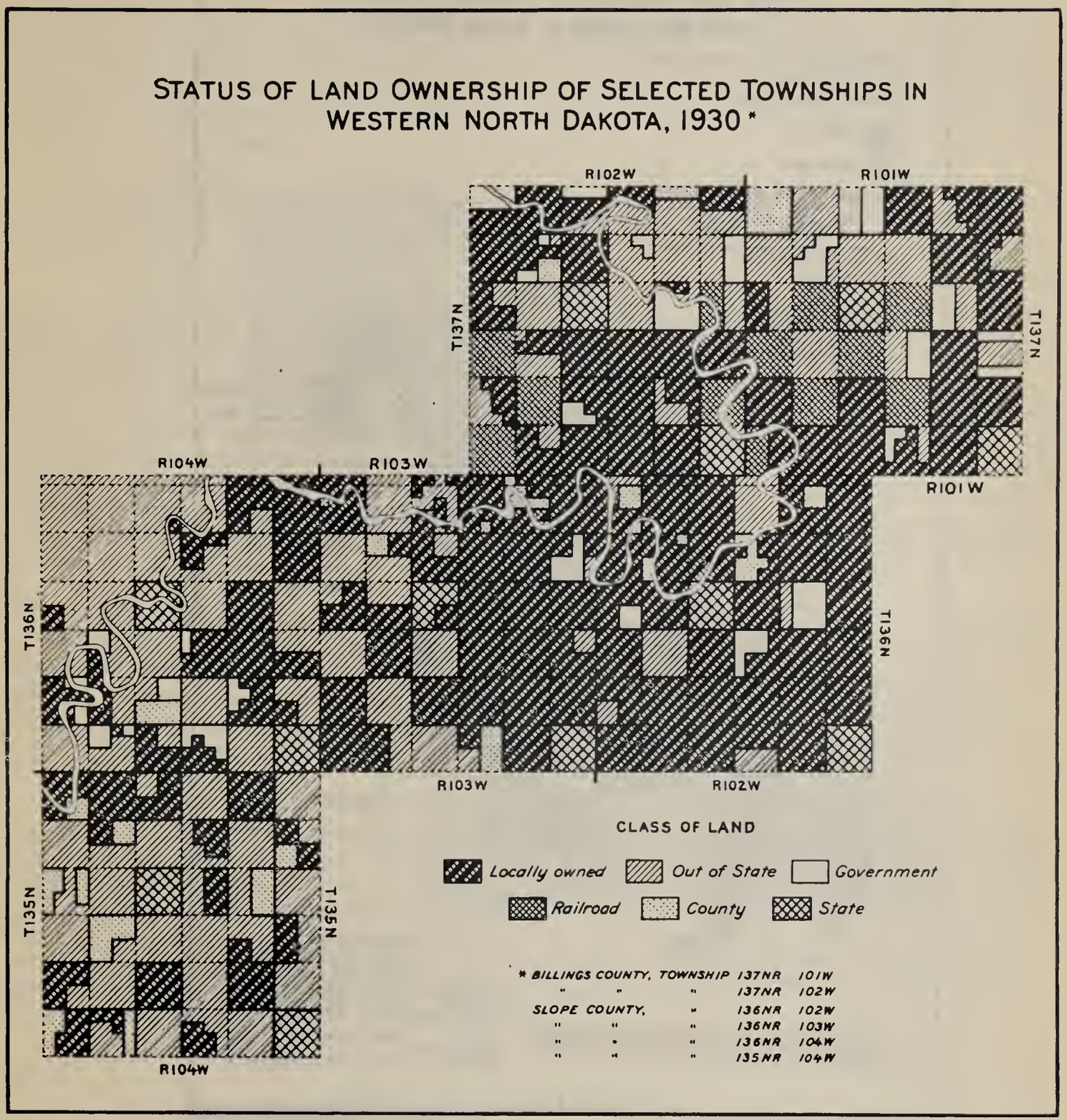

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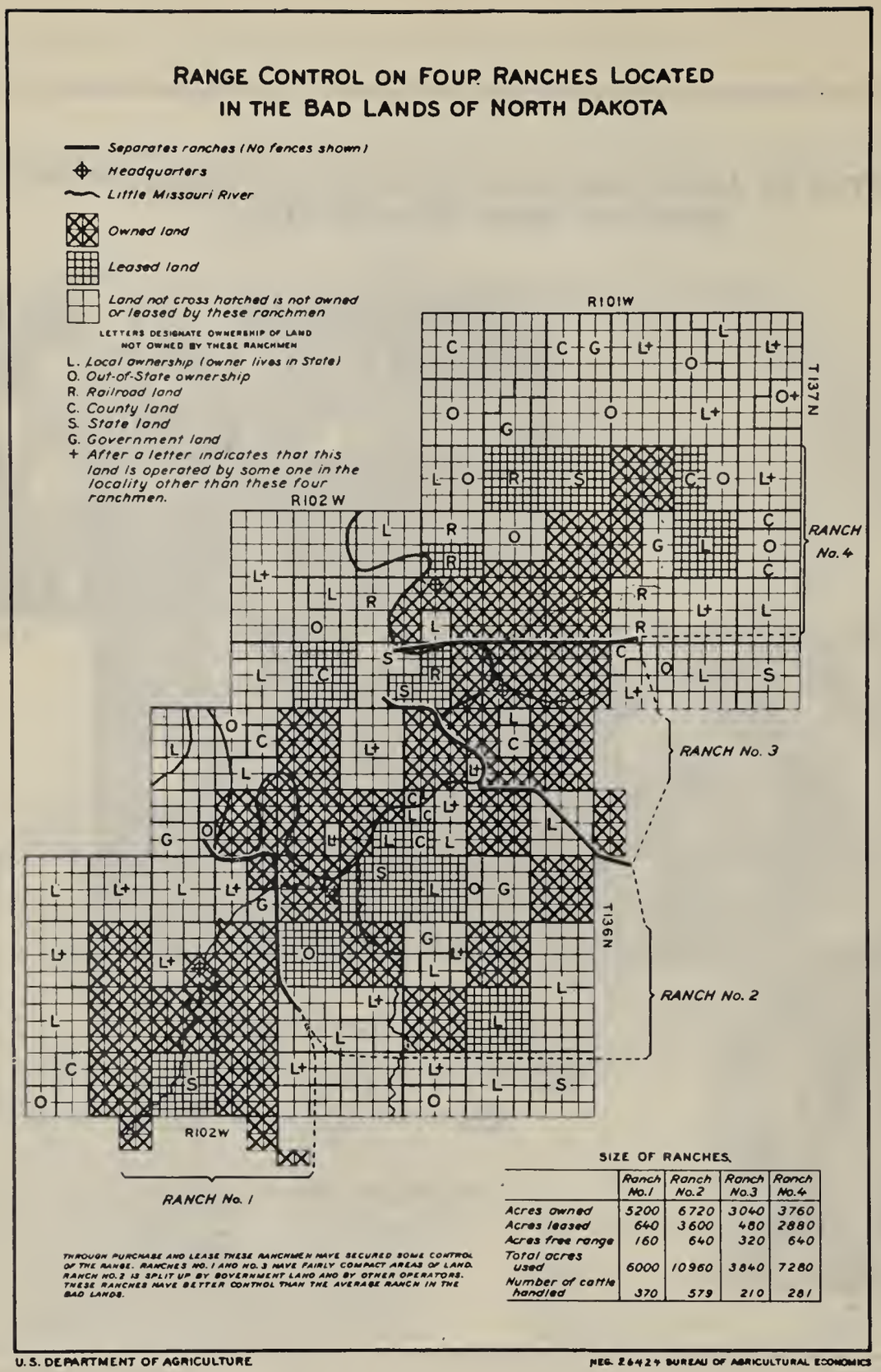
FIGURE 6.- ALTHOUGH THIS AREA IS LOCATED IN THE BAD LANDS, CONSIDERABLE PROGRESS HAS BEEN MADE BY RANCHMEN IN SECURING CONTROL OF GRAZING LAND.



	Ranch No.1	Ranch No.2	Ranch No.3	Ranch No.4
Acres owned	5200	6720	3040	3760
Acres leased	640	3600	480	2880
Acres free range	160	640	320	640
Total acres used	6000	10960	3840	7280
Number of cattle handled	370	579	210	281

FIGURE 7.- THESE RANCHMEN, LOCATED ALONG THE LITTLE MISSOURI RIVER, HAVE OBTAINED THROUGH PURCHASE AND LEASE SOME CONTROL OF THE RANGE BETTER THAN HAS THE AVERAGE RANCHMAN IN THE BAD LANDS. RANCHES NO.1 AND NO.3 HAVE RATHER COMPACT AREAS OF LAND; RANCH NO. 2 IS SPLIT UP BY GOVERNMENT LAND AND BY OTHER OPERATORS.

Occasionally a fairly good piece of crop land, situated in a large area that is otherwise suited only for grazing, is used more or less successfully for farming purposes, but this land would be of greater utility to the region as a whole if used for producing feed in connection with ranching as feed production is one of the great problems of the ranchmen. This farm may prevent the fullest use of the grazing resources of that locality. The ranchmen perhaps cannot afford to pay the price asked for this land, and are thus forced to carry only the cattle that they can safely winter on the available feed supply or they must buy winter feed.

Undoubtedly the percentage of county-owned land has increased and of privately owned land has decreased since 1929 when the information here given was obtained.

The ownership situation in this area makes it difficult for ranchmen to obtain control of a solid tract of land large enough for efficient operation, as it takes about 10 sections or 40 quarter sections for 300 head of cattle. In figure 7 are shown the holdings of land used by several ranchmen; the difficulty of obtaining control of a compact area is readily seen. A comparison of figure 7 with figure 6 shows that these ranchmen had acquired some land between 1929, when the data for figure 6 were obtained, and 1932 when the data for figure 7 were obtained. The optimum utilization of the lands of this area - being as they are, dominantly natural grazing lands - cannot be realized until some sort of control is established. Without control no well planned long-time program of use can be inaugurated.

The Federal interest in this area, however, is only a minority interest as the State and county lands taken together are greater in area than the Federal lands. Land owned by private individuals not living in the State is the largest class. The State and county lands are not a problem as they can be sold or leased to ranchmen. The non-resident owned land is the chief obstruction to the proper utilization of this area.

The first step in the solution of this problem was the withdrawing of the public lands from homestead entry. The Resettlement Administration is meeting the main problem by buying up tracts of land from absentee owners and farmers in the area with a view to leasing the purchased lands together with other public lands to local grazing associations. It is planned that these local grazing associations will obtain control of the State, county, and privately owned grazing lands through leases and that they will control grazing within established grazing districts by issuing grazing permits to the individual stockmen who are to remain within the area.

Survey of Selected Townships

The ownership of each piece of land in 23 townships in 5 counties in western North Dakota was ascertained from the county records in 1929. These records showed that 38 percent of the land in these townships was owned by parties located out of the State (table 54); much of the land shown in table 54 as being owned by "out-of-State" residents was still in the possession of the Northern Pacific Railroad, to which it was originally granted. Thirty-five percent of the land was owned by people located in the State. The Government owned 12 percent of the land, the county 9 percent, and the State 6 percent. Figures 4 to 6 show the ownership for these townships, the scattered character

of Government lands, and the relatively small percentage of land owned by people living within the State. The percentage owned by people actually living on their farms or ranches would be still smaller. In townships that have considerable crop land, such as 136-102 and 136-103 (see fig. 6) the percentage of locally owned land is much higher. In townships in which the proportion of crop land is small, as in 144 -101, 146-100, and 148-97, (figs. 4 and 5), the percentage of locally owned land is small.

The percentage of county-owned land is smaller in the townships covered by this survey than in many other parts of the Great Plains. This can be explained by the fact that a large percentage of the taxable land was owned by the Northern Pacific Railroad whose policy was not to permit its taxes to become delinquent.

To find out what were the feelings and intentions of the non-resident owners of land with respect to land owned in western North Dakota, a questionnaire was sent to each of the out-of-State owners of the land in 23 of the 24 townships shown in figures 4, 5, and 6.

The summary of the results from this questionnaire is given in table 55. This does not include land owned by the Northern Pacific Railroad. It shows that about one-third of the owners in 1929 acquired their land by purchase and one-third by mortgage foreclosure, and one-third by homestead, inheritance, etc. About two-thirds were willing to give a 5-year lease. About one-half were indefinite as to the price at which they would lease and nearly one-third wanted over $25 a quarter section. Fifteen dollars was probably all the ranchmen could afford to pay at that time for strictly grazing land. Two-thirds reported no income from their land. The average income of those reporting any income was $45.70 per 160 acres. Most of this land was undoubtedly hay or other crop land.

A plan that would give some return to the owners and at the same time allow these small tracts to be consolidated and leased for ranching purposes would seem to be in the interests of all concerned. The Resettlement Administration has been buying up tracts of land from absentee owners and farmers in the area with a view to leasing the purchased lands together with other public lands to local grazing associations.

SUMMARY

The cattle ranches of North Dakota are located west of the Missouri River. They fall mainly into three groups. The first group (Class A) consists of those ranches located on uplands away from river flats and outside the Bad Lands. They have a large amount of land suitable for crop farming in proportion to the grazing land available. The second group (Class B) consists of ranches located on river flats or other bottom land where wild hay is the principal feed. Since an abundance of wild hay is available little additional cultivated feed is grown on the ranch. The third and most common group (Class C) consists of ranches located in the Bad Lands. The proportion of land suitable for crop farming in this group is intermediate between the other two groups. The grazing land is very rough and broken and control of sufficient grazing land is the most inadequate of any group because of the ownership situation in this area.

Table 55. - Summary of returns from questionnaires sent to nonresident land owners, western North Dakota, 1931 1/

Item	Number
Questionnaires sent to land owners	314
Questionnaires returned	150
Method of acquisition:	
Homestead	22
Purchase	50
Mortgage foreclosure	54
Tax deed	4
Inheritance	6
Other	14
Owners who will give 5-year lease	100
Owners who will NOT give 5-year lease (sell only)	40
Owners who are indefinite	10
Owners who will lease at $25 or less per quarter	27
Owners who will lease at $26 to $50 per quarter	16
Owners who will lease for over $50 per quarter	24
Owners who will lease at market price	12
Owners who are indefinite	71
Tracts having some fence	53
Tracts having some other improvements	23
Selling price per quarter section	
Owners who offer at $500 or less	31
$501 to $1,000	34
$1,001 to $1,500	9
Over $1,500	36
Market price	12
No answer	28
Owners reporting no income from land	102
Owners reporting some income from land	48
	Dollars
Range of income per quarter section	5.00 to 137.50
Average income per quarter section for those reporting	45.70

Owners having residence in the following States

	Number		Number
Minnesota	48	California	4
Wisconsin	28	Washington	3
Illinois	18	Nebraska	3
Iowa	17	Oklahoma	1
Montana	15	Massachusetts	1
Ohio	6	Dist. of Columbia	1
South Dakota	4		

1/ See page 94 for sample of questionnaire.

Questionnaire

1. Name of Owner _____ Address _____

2. Description, Sec. _____ Twp. _____ R. _____ Acres _____

3. Year title was acquired _____

4. How was the land acquired: By homesteading, purchase, mortgage foreclosure, tax deed, or otherwise? _____

5. Did you use this land yourself in 1929? _____

6. If not, did you lease a part or all of it to others? _____

7. How much was leased? _____

8. Did you lease it for grazing, hay, or farming? _____

9. Did you lease for cash or a share of the crop? _____

10. Amount of cash received $_____ Value your share of the crop $_____

11. Approximate average yearly amount (cash and crop share) received during the last 5 years $_____

12. Do you intend to operate this land yourself during the next few years?_____

13. If not, do you prefer to lease or sell? _____

14. If the land is for dale, what is your lowest selling price? $_____

15. If you prefer to lease, what is your lowest lease price? $_____

16. Would you be willing to sign a lease for 5 or more years? _____

17. Is this land fenced? _____

18. Present value of improvements, buildings, fences, etc. $_____

Other information regarding this land _____

_____

_____

_____

_____

_____

The above information will be kept strictly confidential as far as the individual land owners are concerned and the above answers are in no way binding on the person giving them.

Three- and four-year-old steers are the principal ages of cattle sold, especially on the ranches located on the river flats. Most of the 3- and 4-year-old steers are grass-fat and go direct to slaughter. Some cattle of younger ages are sold from the ranches located in the Uplands and in the Bad Lands. These calves, yearlings, and 2-year olds are sold as "feeders". On the ranches having a relatively large amount of tillable land and a limited amount of grazing land, it is usually more profitable to sell calves and yearlings than either 2- or 3-year-old cattle and as between 2- and 3-year-old cattle it is more profitable to sell 3-year-old grass-fat cattle than 2-year-old feeder cattle especially during the downward swing of the price cycle. Ranchmen with a large amount of grass in relation to the supply of winter feed should sell the older ages of cattle.

The percentage calf crop varies from under 50 to over 90 percent, averaging around 70 percent. The principal factors affecting it are the presence of Bang's disease (infectious abortion), condition of the breeding herd at the breeding season, and the use of breeding pastures. Calf crops can undoubtedly be increased by attention to these factors.

The production of winter feed is the principal problem for these ranches. In a winter with continuous heavy snow all classes of cattle must be fed. In an open winter with little snow the older cattle graze out all winter. Feed production is variable in this area. A hard winter preceded by a poor crop year causes the cattle to suffer. A year's supply of feed in reserve is insurance for this situation.

The feeding of some home-raised grain (if available) to calves during the winter and again towards the end of the grazing season before the yearlings are sold increases their sale weight and price over that of strictly grass cattle and seems a desirable way to utilize feed grains.

Wild hay and small grain cut for hay were the most important kinds of roughage with corn fodder, alfalfa, and sweetclover grown on several ranches but important only on a few. About a ton of roughage per head of cattle to be wintered is provided in a year of normal rainfall. On the upland ranches much of this feed is small grain, corn fodder, etc., as few wild hay meadows are available. The ranches located along river bottoms usually have good wild hay meadows and little, if any, small grain or corn fodder has to be raised for feed. The ranches located in the Bad Lands are short of good hay meadows and have to depend to a considerable extent on cultivated land for feed production. Native hay yielded about one-half ton per acre in 1931 (a dry year) and one ton in 1932. Grain hay and fodder average considerably more per acre than native hay. A rotation suitable for ranches located on the uplands having little or notwild hay is as follows: First year, corn and summer fallow; second year, wheat, of which one-half is seeded to sweetclover; and the third year, oats and sweetclover. In case of failure of the sweetclover this acreage can be seeded to oats or millet. This rotation gives a supply of feed for the livestock and a cash crop in good years.

On ranches where no cash crops are to be raised a suitable crop sequence is (1) corn; (2) oats or wheat in which sweetclover is seeded; (3) sweetclover, grain hay, or millet; (4) summer fallow; and (5) grain hay. On these ranches, a cropping system providing a dependable supply of feed for livestock should receive first consideration.

The proper rate of stocking of the range is the number that will be supported in average years without detericration of the range. The avoidance of increasing the number of cattle when the feed supply is good and the use of separate summer and winter pastures are practices that will help to maintain the ranges in good condition.. Cattle will go into the winter in better condition and losses will be lower if the range is not overgrazed in the summer.

Cash crops are grown on the ranches which have tillable land in excess of the needs for feed production. These crops are of secondary importance to the cattle enterprise because of the uncertainty of obtaining them and because a plentiful supply of feed is a necessity. Wheat may be cut for hay if it is a near failure for grain or if a shortage of hay exists. These ranches averaged around 9,000 acres in size, 450 in the number of cattle, and about $44,000 in investment. About 40 percent of the investment was in land and improvements and 40 percent in cattle, these being the two largest items of investment.

Most of the ranches showed a loss in 1931 and 1932 when cattle were inventoried at market prices since cattle prices were going down during this period. With cattle inventoried at the same value at the beginning and end of each year, they showed a return on investment of 1.4 percent in 1931 and 4.4 percent in 1932. Although receipts from the sale of cattle were less in 1932 than in 1931, the cattle inventory was increased; also the expenses for purchased cattle, feed, and labor were reduced. The net result was that a considerably greater return on investment was made in 1932 than in 1931 when cattle were inventoried at the same prices at the beginning and end of each year.

The ownership situation in this area resulting from the public policy used in disposing of the public domain has been a prime factor in preventing the best utilization of this area because it prevented a ranchman from securing control of sufficient grazing land for an economical operating unit. The policy of the Resettlement Administration in purchasing these scattered tracts and consolidating them into tracts for leasing to local grazing associations, if carried to completion, should largely solve this problem in this area.